A paper prepared for the

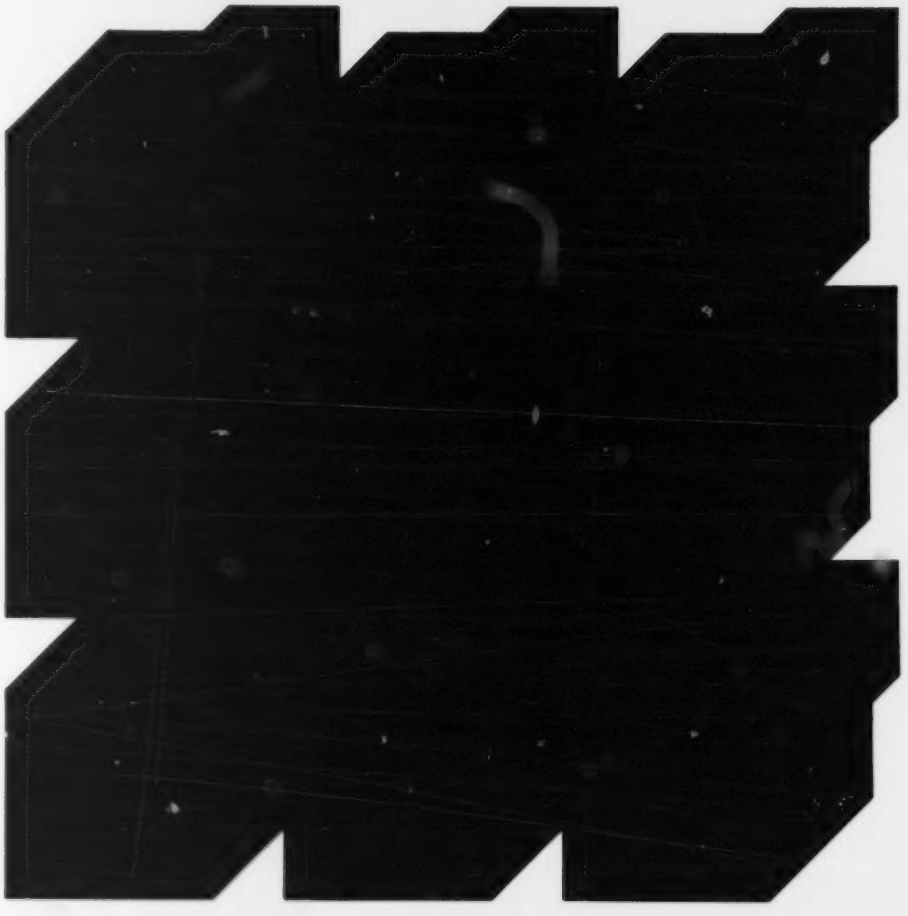
Un document préparé pour le

Economic Council of Canada

P.O. Box 527
Ottawa, Ontario
K1P 5V6

Conseil économique du Canada

C.P. 527
Ottawa (Ontario)
K1P 5V6



86-03779/

The **Economic Council of Canada** was established in 1963 by Act of Parliament. The Council is a crown corporation consisting of a Chairman, two Directors and not more than twenty-five Members appointed by the Governor in Council.

The Council is an independent advisory body with broad terms of reference to study, advise and report on a very wide range of matters relating to Canada's economic development. The Council is empowered to conduct studies and inquiries on its own initiative, or if directed to do so by the Minister, and to report on these activities. The Council is required to publish annually a review of medium- and long-term economic prospects and problems. In addition it may publish such other studies and reports as it sees fit.

The Chairman is the Chief Executive Officer of the Council and has supervision over and direction of the work and staff of the Council. The expenses of the Council are paid out of money appropriated by Parliament for the purpose.

The Council as a corporate body bears final responsibility for the *Annual Review*, and for certain other reports which are clearly designated as *Council Reports*. The Council also publishes *Research Studies*, *Discussion Papers* and *Conference Proceedings* which are clearly attributed to individual authors rather than the Council as a whole. While the Council establishes general policy regarding such studies, it is the Chairman of the Council who bears final responsibility for the decision to publish authored research studies, discussion papers and conference proceedings under the imprint of the Council. The Chairman, in reaching a judgment on the competence and relevance of each author-attributed study or paper, is advised by the two Directors. In addition, for *authored Research Studies* the Chairman and the two Directors weigh the views of expert outside readers who report in confidence on the quality of the work. Publication of an author-attributed study or paper signifies that it is deemed a competent treatment worthy of public consideration, but does not imply endorsement of conclusions or recommendations by either the Chairman or Council members.

Établi en 1963 par une Loi du Parlement, le **Conseil économique du Canada** est une corporation de la Couronne composée d'un président, de deux directeurs et d'au plus vingt-cinq autres membres, qui sont nommés par le gouverneur en conseil.

Le Conseil est un organisme consultatif indépendant dont le mandat lui enjoint de faire des études, donner des avis et dresser des rapports concernant une grande variété de questions rattachées au développement économique du Canada. Le Conseil est autorisé à entreprendre des études et des enquêtes, de sa propre initiative ou à la demande du Ministre, et à faire rapport de ses activités. Chaque année, il doit préparer et faire publier un exposé sur les perspectives et les problèmes économiques à long et à moyen termes. Il peut aussi faire publier les études et les rapports dont la publication lui semble opportune.

Le président est le directeur général du Conseil; il en surveille les travaux et en dirige le personnel. Les montants requis pour acquitter les dépenses du Conseil sont prélevés sur les crédits que le Parlement vote à cette fin.

En tant que personne morale, le Conseil assume l'entière responsabilité des *Exposés annuels*, ainsi que de certains autres rapports qui sont clairement désignés comme étant des *Rapports du Conseil*. Figurent également au nombre des publications du Conseil, les *Études*, *Documents* et *Comptes rendus de colloques*, qui sont explicitement *attribués à des auteurs particuliers* plutôt qu'au Conseil lui-même. Celui-ci établit une politique générale touchant ces textes, mais c'est au président qu'il incombe de prendre la décision finale de faire publier, sous les auspices du Conseil économique du Canada, les ouvrages à nom d'auteur tels que les études, documents et rapports de colloques. Pour se prononcer sur la qualité, l'exactitude et l'objectivité d'une étude ou d'un document attribué à son auteur, le président est conseillé par les deux directeurs. De plus, dans le cas des *études à nom d'auteur*, le président et les deux directeurs sollicitent l'avis de lecteurs extérieurs spécialisés, qui font un rapport confidentiel sur la qualité de ces ouvrages. Le fait de publier une étude ou un document à nom d'auteur ne signifie pas que le président ou les membres du Conseil souscrivent aux conclusions ou recommandations contenues dans l'ouvrage, mais plutôt que l'analyse est jugée d'une qualité suffisante pour être portée à l'attention du public.

DISCUSSION PAPER NO. 301

Government Enterprise in Western Canada's Telecommunications

by Michael Denny

The findings of this Discussion Paper are the personal responsibility of the author and, as such, have not been endorsed by the members of the Economic Council of Canada.

Discussion Papers are working documents made available by the Council, in limited number and in the language of preparation, to interested individuals for the benefit of their professional comments.

La série "Documents" contient des documents de travail dont le Conseil fait une diffusion restreinte, dans leur version d'origine, en vue de susciter des commentaires de la part de spécialistes.

Requests for permission to reproduce or excerpt this material should be addressed to:

Council Secretary
Economic Council of Canada
Post Office Box 527
Ottawa, Ontario
K1P 5V6

ISSN-0225-8013

March 1986

TABLE OF CONTENTS

1. INTRODUCTION..... p. 1

2. THEORETICAL PERSPECTIVES ON GOVERNMENT ENTERPRISES..... p. 7

2.1 Introduction p. 7

2.2 Positive Theories of Government Enterprises p. 7

2.3 Performance, Accountability and Control p.17

3. TELEPHONE COMPANIES AS GOVERNMENT ENTERPRISES..... p.23

4. THE ORIGINS OF THE WESTERN PROVINCIAL TELEPHONE COMPANIES..... p.31

4.1 Introduction p.31

4.2 A Brief History of Edmonton Telephones p.33

4.3 Alberta Government Telephones p.39

4.3.1 Organization and Institution p.43

4.3.2 Prices p.43

4.3.3 Rural Development p.44

4.4 Saskatchewan Telephones p.49

4.5 Manitoba Government Telephones p.52

4.6 Lessons from the Past p.55

5. PERFORMANCE AND ITS IMPLICATIONS..... p.59

5.1 Introduction p.59

5.2 Basic Operating Results p.61

5.3 Sources of Revenue p.69

5.4 Expenditure Patterns p.78

5.5 Income Taxes and Government Enterprises p.85

5.6 Choosing a Capital Structure p.90

5.7 The Cost of Capital p.97

6. EVALUATION AND CONTROL..... p.107

6.1 Introduction p.107

6.2 Agents and Incentives p.107

6.3 Objectives p.108

6.4 Regulation p.118

6.4.1 The 1983-84 AGT Rate Case p.120

6.4.2 The Structure of Accountability in Manitoba p.129

7. THE FUTURE OF GOVERNMENT ENTERPRISES..... p.141

8. CONCLUSION..... p.153

9. BIBLIOGRAPHY..... p.157

RÉSUMÉ

Les services de télécommunications dans les provinces du Manitoba, de la Saskatchewan et de l'Alberta ainsi que dans la ville d'Edmonton, sont assurés par des entreprises publiques. Contrairement aux services d'électricité qui, au Canada, sont presque toujours fournis par des entreprises publiques, la majorité des services téléphoniques le sont par des monopoles réglementés.

L'auteur se penche d'abord sur la raison d'être des entreprises publiques. La documentation existante sur les motifs qui font opter pour la formule de l'entreprise publique et sur son efficacité est insuffisante. Des tentatives ont été faites pour établir, en s'appuyant sur le droit de propriété, une théorie montrant la valeur positive de l'entreprise publique, à partir de laquelle il aurait été possible d'examiner les coûts de l'organisme et la théorie de la bureaucratie. Malheureusement, la théorie économique de la démocratie n'est pas suffisamment développée pour fournir des directives claires sur le choix politique des instruments à utiliser pour la formation et l'utilisation d'entreprises publiques de préférence à d'autres formes d'institutions, par exemple, des monopoles réglementés. Sans cette information, il est impossible de faire concorder la volonté politique du gouvernement avec la doctrine sur le droit de propriété. Pourtant, cette concordance est nécessaire.

Les raisons qui ont motivé jadis la création des sociétés publiques de téléphone subsistent à peu près telles quelles encore aujourd'hui. Voilà pourquoi nous avons tenté de comprendre les premières décisions touchant l'industrie du téléphone dans l'Ouest canadien. Dans tous les cas étudiés, le principe de la propriété publique a été adopté dès le début de la colonisation de ces régions. On craignait surtout qu'un monopole privé, détenu par les Téléphones Bell, ne puisse fournir les services à un coût raisonnable à la population clairsemée des Prairies. Par contre, on était convaincu que les régions nouvellement colonisées pouvaient être desservies par des entreprises publiques, et le téléphone était considéré comme un service d'utilité publique au même titre que l'eau et l'électricité.

Les sociétés de services téléphoniques ont eu beaucoup de difficulté à établir des réseaux ruraux. La Dépression a détruit toutes les premières tentatives à cet effet. Ce n'est que grâce à la hausse des recettes du service inter-urbain durant la période d'après-guerre que ces sociétés ont

pu recommencer à financer d'importantes améliorations du réseau rural.

La performance de ces entreprises publiques peut être classifiée selon divers aspects. Premièrement, elles ont réussi à fournir le service de téléphone à de faibles coûts sans créer de problèmes financiers ou politiques aux gouvernements concernés. Deuxièmement, à l'instar de toutes les autres sociétés de téléphone, elles ont établi leurs prix sans les mettre en rapport étroit avec les coûts. Nous avons examiné les avantages financiers qu'ont obtenus ces sociétés par leurs crédits d'impôt et leurs faibles taux bruts de rendement. Ce dernier avantage résulte autant de leur coefficient d'endettement élevé que des faibles taux d'intérêt de leurs emprunts cautionnés par l'État.

Les deux dernières sections de ce Document portent sur l'évolution du contrôle des entreprises et sur leurs perspectives d'avenir. Dans une grande mesure - et malgré l'existence de règles implicites - le contrôle de ces sociétés et leur imputabilité ne se sont exercés, sur le plan pratique, que d'une façon informelle. Les gouvernements concernés sont assez petits pour qu'il puisse exister une interaction directe et considérable entre les députés ou les fonctionnaires et la direction de ces sociétés. Aucun instrument de contrôle élaboré, formel et public n'est en place, et personne n'en ressent non plus le besoin.

L'avenir des entreprises publiques est menacé par l'avènement de la concurrence dans le secteur des télécommunications. Ainsi, les recettes provenant de services interurbains qui soutiennent ces sociétés depuis trente ans risquent d'être considérablement à la baisse. Sans un monopole dans la prestation des services, la méthode actuelle des subventions versées par l'État à ces entreprises est menacée. Nous en sommes réduits à nous demander si, dans un contexte marqué par la concurrence, les entreprises publiques auront encore un rôle à jouer.

ABSTRACT

Telecommunications services in the Provinces of Manitoba, Saskatchewan and Alberta and in the City of Edmonton are provided by public enterprises. While Canadian electric utilities are almost all public enterprises, most Canadian telephone services have been provided by regulated monopolies.

The study begins by considering the theoretical basis for government enterprises. The existing literature on the reasons for choosing government enterprises and their effectiveness is inadequate. There have been an attempts to establish a positive theory of government enterprises based on property rights theory and this can be extended to consider agency costs and the theory of bureaucracy. Unfortunately, the economic theory of democracy is not sufficiently developed to provide clear guidelines about the political choice of instruments involved in the formation and use of government enterprises versus other institutional forms, i.e. regulated monopolies. Without this step it is impossible to combine the political will of the government with the property rights literature. The combination is required.

The basis for the development of public telephone companies has changed very little since their inception. For this reason an attempt was made to understand the early decisions about the telephone industry in Western Canada. In all our cases, public ownership was established very early in the settlement in these areas. There was considerable fear that the private monopoly, Bell Telephone, would not provide services throughout the sparsely populated Prairies at a reasonable price. This was buttressed by convictions that the newly settled areas could be served by government enterprises and that telephones were a public utility like water and electricity.

The telephone companies had a very difficult time establishing rural networks. The depression destroyed the early attempts to fulfill this mandate. It was only with the growth in long distance revenue in the post-war period that these companies were able to return to major subsidized improvements in the rural network.

The performance of these government enterprises can be classified in several dimensions. First, they have been successful in providing telephone service at a low cost without creating fiscal or political problems for the governments involved. Second, like all telephone companies, they have priced their services in a manner that is poorly related to

costs. An investigation was undertaken of the financial advantages conferred on these companies by their exemption from income taxes and their low gross rates of return. The latter arise from the high debt to equity ratio and the low interest rates associated with government-backed debt.

In the last two sections the evolution of the control of the enterprises and their prospects for the future are discussed. To a large extent, control and accountability has operated in informal ways in practice although there are explicit rules. The Governments involved are sufficiently small that there is considerable direct interaction with members of the government or its civil service and the Companies. Elaborate formal and public control features do not exist and are not perceived as necessary.

The future of the government enterprises is threatened by the approach of competition in telecommunications. The long-distance revenue which has supported these companies for thirty years may be sharply reduced. Without a monopoly in the provision of services, the current subsidy practices of the enterprises and their governments are threatened. It is unclear if there is a future role for government enterprises in a competitive environment.

1. INTRODUCTION[1]

Canadian Government Enterprises perform many different functions. They have arisen in wide variety of political and socio-economic environments. Attempts to classify and explain the origins and scope of these enterprises have been largely unsuccessful[2]. This report is one study in the Economic Council of Canada's investigation of Canadian Crown Corporations. Our task is to consider the four telecommunications companies in Western Canada that are government-owned. Three companies, Alberta Government Telephones (AGT), Saskatchewan Telephones (SaskTel) and Manitoba Telephone System (MTS) are owned by the Provinces. The fourth, 'edmonton telephones' ('et')[3] is owned by the City of Edmonton.

The general perception of government enterprises is often of firms that are wasteful, mis-managed and a financial drain on the government treasury. This may often be the truth and the

---

[1] I have benefitted from discussions with officials of all of the publicly-owned companies. Specific attribution has been avoided and no one but the author is responsible for the contents of this report. The report has also been improved by the patient help of Arthur Kael and Ron Hirschorn of the Economic Council of Canada as well as several anonymous readers.

[2] Several attempts are contained in Pritchard (1983).

[3] The companies current proper name is 'edmonton telephones' or 'et'.

perception, true or false, motivates the Council's concern for investigating the performance and control of government enterprises.

The government firms in telecommunications do not generally fit the characterization of a typical troubled government enterprise[4]. In ways, that we will discuss more fully below, they are successes relative to many other government enterprises and relative to a practical standard of maintaining good relations with their customers and owners. Assuming that I am correct in this judgement, this report must have a focus that is slightly different than others in the series of Council studies. We will be trying to analyze why all four firms have been relatively successful. The firms are certainly not identical. Their relations with their owners are handled in different fashions and they serve quite different regions. We will argue that the methods of control and performance evaluation have not been the primary determinants of success for these government telecommunications firms.

The second section of the report discusses the available theoretical basis for analyzing government enterprises. We argue that the theory is not particularly well developed. The section reviews the arguments emanating from the property rights

---

[4]Government enterprises in utilities of all kinds have not become serious problems for governments except in exceptional situations.

school. This is followed by a discussion of the theoretical concerns arising from agency costs and the analysis of bureaucratic decision making. Finally, the section analyzes the difficulties of control problems and the evaluation of performance.

The third section discusses the special nature of government enterprises in the North American telecommunications industry. The premise is that a combination of the structure of the industry, some wise decisions by the government enterprises and technological levels and developments made the success of the government enterprises possible. This is not absolute success but only a limited but important practical notion of success.

The fourth section is an exploration of the history of these enterprises. All of the government telephone systems were created between 1905 and 1910 during the early and rapid settlement of the Canadian West. They are relatively unique in the North American telecommunications industry which is mainly privately owned[5]. Since their founding, the broad objectives which led to the creation of the enterprises, have not been changed although the difficulties of achieving these objectives have been perceived more clearly. In order to understand the motivation for the

---

[5]There have been many rural coops and a few municipal phone systems.

creation of the government telephone systems, it is necessary to consider their early history.

All of the telephone systems were initially controlled through government departments. The creation of the current forms of government enterprises was a long slow process which was not completed until the fifties or sixties. The limited available historical evidence permits us to consider the ability of these enterprises to fulfill obligations that the governments undertook when they initially created the enterprises.

The fifth section evaluates the performance of the government-owned firms. An unsuccesful attempt was made to collect enough data and to estimate some models[6] as a segment of the report. As an alternative, an extensive comparison based on financial data for the four government enterprises and three private regulated firms was undertaken. It is often claimed that the price advantage of the government enterprise is built on two implicit subsidies. These are the exemption of government enterprises from corporate income taxes and their low gross rate of return. The latter is based on the high debt to equity ratio and the low interest rates associated with the government backed debt.

---

[6]The problems were partially with the data simply not being readily available from past years, partially a concern with confidentiality and partially econometric results that did not make sense.

The sixth section describes the mechanisms that the governments use to control and evaluate the enterprises at this time. In all cases there is a great deal of informal interaction between the companies, agencies or commissions created by the government and the government itself. There are few if any discussions and evaluations of these procedures that are in the public domain. The legal details are available in the Acts of Legislation but these do not provide evidence of the system in operation. Included in this section will be a discussion of the limited but growing role of regulation in the sense that is common in the private telecommunications industry.

Section seven focuses on the impending difficulties confronting these government firms. The first question is how to re-define the objectives of these enterprises. Competition in telecommunications is growing and it can not be prevented in the long run. The governments in Western Canada will have to radically think about the objectives of these enterprises for the first time in many years. If competition arises in the long distance market the implications for the Provincial government enterprises are serious. The very low local telephone rates of these companies depends on the high toll revenue that is available to them. Once this disappears, the local rates will have to rise. The plans or thoughts that the governments have for these enterprises are not fully developed or publicly available but

this section will discuss the future of government enterprises in telecommunications.

The final section attempts to draw together the lessons of the previous sections.

2. THEORETICAL PERSPECTIVES ON GOVERNMENT ENTERPRISES

2.1 Introduction

To provide some background for our investigation of the telephone companies, a discussion of the available theoretical perspectives on government enterprises is useful. We will begin with a discussion of some general perspectives on the use of this form of production and turn to more specific issues in the later portions of this section.

2.2 Positive Theories of Government Enterprises

There have been a number of attempts to provide a positive, in contrast with a normative, analysis of government enterprises. In this section[7], we will discuss two schools of thought that have had considerable influence on the analysis of government enterprises. The first has evolved from the property rights model of the firm. The second has links to the positive theories of government and bureaucracy. As we will discover neither provides an adequate theory, with testable implications. Their discussion is useful for two reasons. They provide an important organizing device for consistent thinking about government enterprises. Second, there are no other theoretical perspectives on government enterprises. Of course, there are many other theoretical areas

---

[7]This section has benefitted from the excellent surveys by Bocherding et. al.(1981) and Bocherding(1983). These studies are highly recommended as a starting point for further investigation. I have not agreed with everything that is said in these sources but this is not the place for that debate.

in economics which can contribute to an understanding of government enterprises.

Consider the basic general question. Why choose a government enterprise? There are many other institutional alternatives for the production of telephone services. Rather than directly answer the general question, the property rights school poses a related set of questions. What are the efficiency implications of alternative institutional arrangements in production? The answers that are derived are dependent on models of the firm originally introduced by Stigler(1951) and Coase(1937). This type of theory of the firm stresses the organizational problems of operating an enterprise. The latter may be thought of as the degrees of freedom remaining after the technical constraints are considered.[8]

In this theory, the firm has an owner who controls, directly or indirectly, the factors of production. The owner has rights to the residual income of the firm, while the other factors, human or not, receive payments or income based on prior contractual arrangements. The owner, or his agent, must coordinate the the use of the contracted inputs in order to produce and sell output. Since the net income belongs to the owner, the latter has an incentive to monitor, directly or

---

[8]There is no literature that seriously treats the difficulties of integrating the technical and organizational approaches to the firm. This is a serious limitation.

indirectly, the tasks required to produce the product in an efficient way. That is, the owner will attempt to maximize his private wealth, ignoring any other objectives he might have. With the normal caveats about a competitive environment, the private owner will push the firm towards socially efficient production in his attempts to maximize private wealth.

Restrictions on property rights, in use or exchange, will reduce the efficiency of firms in this task of socially efficient private wealth maximization. For example, government regulation usually involves restrictions on the use, and perhaps the exchange rights of the owner. If we think of a spectrum of restrictions on rights, then government ownership effectively abolishes all private use and exchange rights.

The effects of limits on use rights are fairly straightforward and the literature, that is related to government enterprises, has often concentrated on restrictions on transferability or exchange. Restrictions on exchange rights may prevent the person who might have maximized the wealth from the use of the asset from obtaining ownership. The key to the acceptability of these ideas is the focus on private wealth maximization as the objective of interest. In attempting to capture government enterprises within this framework, some major difficulties arise.

The property rights literature strives to provide links with government enterprises along several dimensions. To clarify the alternatives, initially assume that there are only two types of firms. There are no private agents. Private firms are operated by owner-managers. Government firms are run by government managers. The objectives of the managers of both firms is, by assumption, the maximization of the value of the firm, i.e. wealth maximization. The property rights literature sights three sources of disadvantage for the manager of the government enterprise relative to his private counterpart. First, since the government manager is assumed or asserted to have a reduced, or no, financial stake in the success of the firm, the government manager will be less efficient. Second, since there is no capital market in the assets of the government firm, no overall evaluation of the firm exists. Third, which is closely linked to the second, the absence of this capital market implies that the government manager can not be replaced by a more efficient manager through a purchase of the firm on the capital market.

Given the restrictive conditions of our example, the arguments for the relative inefficiency of government enterprises has some force. However, the empirical verification of this type of hypotheses is difficult since the conditions required are seldom met. Before we relax the stringent assumptions, a few comments on each of the implications will be useful.

The first point, the lack of a financial stake in the government enterprise by the manager, is easily improved by the implementation of a managerial incentive scheme tied to the firm's performance. This will introduce a basic issue which we have avoided. Agency aspects were left out of the problem intentionally but they will be explicitly considered below for both types of firms.

The second point is important. It is very difficult to judge the long run potential of any firm, private or public. The existence of publicly traded shares provides some information not available elsewhere. The exact value of this information has not been determined. This is unfortunate and we will return to this issue. If a firm is not traded, estimates of its market value may have a much larger variance as well as a different mean. The evidence that market share values, at any moment, are good predictors of future
share values is limited, since the uncertainty about the future is so high.

The third dimension of the private firm's advantage requires one of two arguments. If there is an ownership skill, different from a managerial skill, then the inability of potential owners to buy a government enterprise will be a source of inefficiency. It will be difficult to distinguish managerial and ownership skills but it may be possible. The second argument returns to an

agency type of argument. It is not the usual agency case. Whatever the incentive scheme offered to managers, it can not be extended to be equivalent to a full claim on the residual income of the firm. This would turn managers into owners or owner-managers. If the incentive scheme that is required to maximize wealth is equivalent to ownership rights, then the restriction of the manager to agency will imply an inefficiency for government enterprises.

The initial set of constraints was designed to illustrate several points in an environment that appears to be implicitly used in the literature. There are three obvious constraints that we wish to release. The property rights literature is not the same as the agency literature and that was the rationale for the earlier exclusion of agency problems. We will now permit the separation of ownership and management in the private firm.

Second, the property rights literature does not recognize an important role for the government owner. We will now explicitly introduce a government owner. The agency problem will permeate both private and public firms. The arguments for the efficiency advantages of the private firm will be substantially weakened by this change.

The explicit introduction of the government owner will force us to reconsider the objectives of the firms. The government

owner certainly has objectives. However ill-defined and rapidly changing, they are not equivalent to profit maximization, in the short or long run. This will imply that the many empirical studies that do not control for varying objectives when studying the relative costs of government vs private firms are not very informative unless carefully interpreted. It is, of course, quite difficult to control for the varying objectives.

While the studies of the cost inefficiency of government enterprises may be unconvincing and are often poorly done they are important for a different reason. Accurate information about the costs of using government enterprises for political purposes is seldom available. Politicians and the public ought to know the costs of non-commercial objectives in order to be able to evaluate how intensively to pursue these objectives. This is a much more important purpose than any simple catalogue of the supposed excess costs of government enterprises.

With these extensions of our restricted model, we are left with the following characterization. Both private and government owners have agency problems which may be more difficult in government enterprises for reasons that we will discuss later. The divergence of objectives must be directly confronted. Further evidence is needed on the consequence, for any set of objectives, of the absence of a capital market in the firm. Recall that this

market will potentially assist in performance evaluation and assuring efficient ownership.

The objectives that a government owner has for a particular government enterprise are only part of, or a particular manifestation of, a broader set of political objectives. Inside a government or a political party, there is an active market in political talent. Ministers and party critics can be and are changed. It is these markets that are the proper mechanisms that ought to be investigated as the appropriate substitutes for the capital market in ownership. Members of the government who have political ownership skills may seek or be sought for the job of overseeing the government's enterprises. I do not wish to push the market analogy too far. In non-market language, there are political mechanisms for evaluating the political performance of those politicians who are responsible for a government enterprise. Some of these are internal to the government but ultimately, the electorate may be involved. As a hypothesis I am arguing that this is the right area to investigate. The absence of a capital market for the firm can be over-played. There may be a role for the capital market but it must be considered as part of the complete picture and not by itself.

Perhaps the greatest failure of the property rights school is the complete omission of any concern for the objectives of the governments that own the enterprises. Without a direct concern

for these objectives the property rights school does not provide a complete analysis or a very testable set of implications for studying government enterprises.

There are two additional considerations that we wish to add. First, even with the limited objective of maximizing private wealth, the efficiency of private firms requires a competitive environment to translate the pursuit of private goals into a social good. The degree of competition may be very important. We wish to develop this aspect more carefully. Second, the addition of regulation to these models requires some comment.

Government enterprises very seldom operate in flourishing competition with private competitors. In fact, when there is competition there is often regulation of the competition. If there is competition, even of a restrained variety, its existence may force both public and private firms to be more efficient by making the costs of inefficiency, in private wealth creation, both higher and more visible. Moreover, the pursuit of alternative goals by either type of firm may become more difficult and certainly will appear more expensive. The weakness of competition, in addition to, or rather, than the problems emphasized by the property rights school, may be a cause of inefficiency.

The literature[9] on the economic theory of democracy, government and the bureaucracy might provide the required bridge between the positive theory of the organization of production and government ownership. While this literature is insightful and interesting, it does not provide the necessary completeness that would permit the testing of hypotheses.[10] The importance of this literature should not be underestimated. Government enterprises are selected by governments as a policy tool. The bureaucracy as agents of the government oversee the operations of these enterprises. If we are to understand the creation and activity of government enterprises then it is necessary to have a theory of government. It is not available at the moment and will be difficult to create.

Niskanen focussed on the bureaucracy and its capability of pushing programs that it wished to develop. The bureaucracy offers the politicians all or nothing programs and enlists the assistance of particular groups of politicians. This theory can be made consistent with the median voter theory of democracy. Many variants of this model have been developed. There are two aspects that we will discuss. First, one strand

---

[9] Examples are Downs(1957), Breton(1974) and Niskanen(1971). A Much larger journal literature has developed. Some of it is discussed in Bocherding(1983).

[10] Palmer(1983) has tried to use this theory in his analysis of a government owned bus line.

of thought has focussed on the bureaucracy. For this group, the major issues are modelling the objectives of the bureaucracy and the constraints that the bureaucracy confronts. Since the objectives may be multi-dimensional, although all utility enhancing, it is difficult to precisely model and collect data that would adequately model the situation. The constraints are even more complex, since the politicians must be modelled and the possibilities of interactions within the bureaucracy can not be ignored. The particular studies have tended to select, a priori, many aspects of the modelling problem. This has left their results conditional on many possible alternatives. It is not sloth that has created this situation. It is difficult to model, let alone obtain data, for this very complex framework.

If there is no satisfactory general theory of government enterprises there are many detailed questions that we will pursue in the body of this study. The general approaches will assist us in suggesting ideas and we will refer back to these models in certain instances.

2.3 Performance, Accountability and Control

In a separate lengthy document, Denny(1984), I have discussed the problems of performance measurement. That material will only be briefly summarized in this report. Moreover, other researchers are considering in more detail the problems of accountability and control. The actual practices of the telephone companies will be

outlined in a much later section. One point will be stressed throughout this section. The problems in all these areas are serious for both private and public firms. However, there is no easy mechanism for eliminating the problems and only a few reasons to believe that they are more serious in government enterprises. The emphasis that has sometimes appeared on the uniqueness of these problems in government enterprises and/or the availability of ready-made cures is misleading.

The measurement of performance for a single firm is difficult even if the firms only objective is the maximization of wealth. There are three basic problems. Activities or actions, undertaken in any time period, have consequences that extend beyond that time period. These consequences will not be fully known and may not be captured by the chosen performance measure.[11] An example is the measure, current profits, which will not reflect future profits or the value of current expenditures on future profits. It is often believed that the stock market provides an effective solution to this problem. The stock market only has some of the information and even that information is very uncertain. Consequently, the existence of a stock market is not an effective measure of long run performance. Unfortunately, there is no

---

[11]The Fisher and McGowan(1983) paper re-invents this point in the context of monopoly profit measurement.

adequate study of the value of stock market information[12]. The third point is that current or future profits are effected by actions from other time periods that are beyond the control of the firm. Whether performance measures should fully include these effects depends on the purpose of the measure. It is often difficult to eliminate the external effects[13].

The issues of control and accountability are not independent of performance measurement. To the extent that performance measures are weak or inadequate, control and accountability are more difficult. It is difficult to hold someone accountable when performance can only be poorly measured. Control requires mechanisms that respond to performance indicators and the same comment applies.

Performance measures require the prior specification of objectives. If this appears simple for the private firm, it is one of the difficulties for the government enterprise. Governments seldom specify clear objectives for their firms. Moreover, publicly stated objectives are not only fuzzy but often fail to explicitly mention the political objectives that

---

[12]To the extent that stock market prices follow a random walk, there is no information about tomorrows price in todays price. Consequently, there is no measure of improved performance.

[13]There are extensive efforts to evaluate portfolio managers which wrestle with these problems.

are always present. It is unlikely that governments would like to fully specify objectives in advance. One of the potential advantages of government enterprises is that they may be used flexibly to meet objectives or purposes that arise through time. These uses may be highly publicized or kept very quiet depending on the situation. Prior commitments on the enterprise's objectives limits the governments policy flexibility.

The public often receives news that suggests that there is no control over public enterprises and that they are out of control. Proof that this is the case is seldom offered and would seem to be very unlikely. Governments are in control of their enterprises and the latter are accountable to the government. This does not mean that mechanisms for control and accountability could not be improved but only that the primary responsibility remains with the government. Managers of government enterprises have very little long run incentive to fool the government. Most of the long run problems arise from a lack of government desire to curtail the activity of their enterprises. The nature and form of the control and accountability are certainly topics for dispute within the government but it is excessive to suggest that the government has lost control.

Almost all government enterprises are under the control of a particular Minister. Many government enterprises, perhaps

most will have a Board of Directors or something equivalent. The Board will usually have members who are senior civil servants and company executives. It may contain politicians and it may contain outside individuals. This structure is not dissimilar to private corporations and most of the difficulties in control and accountability will not be different from those in private corporations.

The government is the ultimate owner of the enterprise and the role of the Board is delineated and defined by what the government wishes to do or not do through the Board. In this sense, it is not like a widely held private corporation in which the direct influence of shareholders may be very weak. It is closer to a tightly-held corporation in which the board is controlled by the primary owner(s). The Board may be used extensively for public relations and most of the details be carried out through direct contacts between the management and the government. The latter may be the Minister but is more likely his staff.

A very wide variety of control and accountability mechanisms have been used in both private industries and government enterprises. There does not appear to be a single set of procedures that is better in all situations. The following points are important.

1. The government must decide if it has objectives for the firm and translate these into a concrete form that can be used to control, evaluate and hold accountable the Board and the management.[14]

2. If the objectives are reasonably well-defined then a Board can control and evaluate the firm.

3. Evaluation will always be subjective to some extent.

---

[14]Although it mat be surprising, governments may prefer to have ill-defined objectives. In that case, the firm will be difficult to control.

3. TELEPHONE COMPANIES AS GOVERNMENT ENTERPRISES

Government enterprises exist in many different types of industries. The characteristics of the industry will dictate limitations on behavior, require certain skills and impose a particular set of risks. In this section we will discuss some aspects of the telephone industry that bear on the performance of government enterprises in the industry.

There is often a perception in many parts of North America that government enterprises develop very poor telecommunications systems. This perception is based on direct, although often limited, experience with the European telecommunication systems which are almost all government enterprises. Without developing any discussion of the European case, the four Canadian government enterprises provide direct refutation that a government enterprise must necessarily provide a poor telecommunications system. There is little or no evidence that these enterprises have supplied distinctly inferior service compared to their private counterparts in the rest of North America. If there are faults in the North American telephone industry, and there are, they are faults shared in common by both the public and private firms to a greater extent than they are faults of either the private or public firms separately. The government enterprises have shared in many of the

telecommunications policies that developed throughout North America.

During at least the first six decades of this century, an operating telephone company has not been a 'high tech' firm. The term operating company is deliberate. An operating company is one that provides telephone services to subscribers using purchased equipment. Provided the operating company refrained from the development of new products and processes there was very little exposure to technological risk in either the processes or the products. The timing of the introduction of new products could be a problem but major disasters have been avoided. The government enterprises, like their private counterparts in the industry, may have been overly cautious in the introduction of new services or options within existing service categories. If they were, this was part of the tradition in the North American industry and arose because of the lack of competition.

Telephone companies were dominated by engineers but these were practical engineers and it was applied ingenuity that was important. There were few if any university graduate engineers in the western telephone companies until the 1950's. These were line companies, where experience counted for almost everything and working up from the bottom to the very top

was not uncommon. Technical knowledge was acquired on the job.

Technical improvements in the telephone system were enormous during this century. However, this knowledge was widely disseminated amongst the telephone operating companies. The structure of the North American telephone market facilitated this process. The market, for telephone services, was divided into many areas with monopoly suppliers. Once the market pattern was stabilized, a company that made a technical innovation could not use this capability to improve its share of the telephone service market. The innovation had to be marketed to the other firms in the industry. Consequently, the government enterprises were soon offered an opportunity to purchase innovations from either independent telephone industry suppliers or those tied to one of the larger telephone systems. The government enterprises were free to purchase from any supplier and they did. There were almost no attempts to place restrictions on their purchasing policies. Moreover they did not become committed to the major development of telephone equipment. There were direct and immediate benefits to these policies. Innovations from all sources were readily available with the technical support to implement them. High risk development projects did not create financial problems. Unlike the major North American integrated telephone systems, there was no waiting until the captured supplier developed a

comparable product. The story of the European government telephone enterprises is substantially different in this area and some of their major problems arose from their more self reliant equipment development policies. In North America, the electric power industry has had developments, similar to the telephone industry, with both public and private suppliers having access to technological developments.

It will be useful to describe abstractly, and in simplified form, how a telephone system works. Since subscribers wish to be able to talk with potentially all other subscribers, a connection is required between any pair of subscribers. While direct permanent connections are technically feasible they are far too expensive. Each subscriber is directly connected to a Central Office. The Central Office directly or indirectly connects, via switches, the caller, to the party to whom he wishes to speak. In the earliest manual systems, operators had to physically make the connection and this often required two operators shouting instructions to one another in a crowded and noisy office. Central Offices are linked to each other, directly or indirectly, by trunks that permit the system to connect callers with subscriber belonging to another Central Office. The local loop is the dedicated connection between the local subscriber and his/her Central Office in a single party system. For multi-party service, the loop is shared. The density of subscribers served by a

central office will determine how many miles of wire or cable must be installed to service the Central Office. The high cost of low density or rural systems is associated with this construction cost.

The local loop is unused most of the time by most subscribers. This implies that the switching capacity can be far below the number of lines. There are substantial peaks to usage and the switching capacity is basically planned to ensure that peak demands can be met. Formally, this is translated into a probability that a caller will not be able to complete a call. Trunk lines, between Central Offices, can also be used for any call and consequently, they can be planned on a probabilistic basis to minimize the number of voice channels required to meet demand subject to a probability of failure. If connections are to be made automatically, the system must have a means of communicating internally. This is what the dial or pulse does from the phone set but there are many other communications within parts of the system. While there are many fine details in an actual phone system, the core of the processes are described above. With this fairly straightforward technology, an operating company can provide telephone service without undue risks of major mistakes.

A simple phone system over distances of a few miles can be very cheaply constructed. Many of the rural systems in

North America used barbed wire as a means of transmission. This type of system will have low quality transmission and may be subject to high maintenance costs. Even more important, if the transmission quality of the lines is low, automatic equipment will misinterpret the command signals sent by the system and create serious malfunctioning. Much of the historical improvement in phone systems can be characterized by a steady stream of cost effective improvements in the reliability of equipment and transmission that eliminated troubles and the ensuing labour and other costs. The system has become more automatic, particularly with the introduction of DDD. In the last decade the possibilities for enhanced services through computerized switching has become a reality. Although not dealt with explicitly in this brief description, the major innovations in long distance transmission have dramatically driven down the costs of that service.

Suppose we assume that the government enterprises in Western Canada have been successful in a manner that I will make clear. What is it about this industry in contrast with others that has made successful government enterprises possible?

In this context success is being used in a limited but practically crucial sense. First, the government telecommunications enterprises have been successful in delivering telephone services that are comparable in price,

quality and range of service to other private telecommunications companies. Second, they have been able to do this without becoming a major source of financial or political distress to their owners, the governments. Third, they have been used with limited success by their government owners for purposes other than strictly commercial ones. That is, from the governments perspective, they have not been a liability but rather an asset. Many, if not most government enterprises have failed some or all of these simple criteria. We want to analyze the reasons for success in our telephone cases. To ensure that there is no confusion, these criteria are not those which an economist might normally apply to an industry. That very different set of criteria will be discussed elsewhere in the report.

The core elements have been mentioned earlier in this section but they need to be drawn together. Let us begin with a simple hypothesis suggested to me by several members of these government enterprises. A telecommunications firm could not fail our criteria because the flow of cost reducing technical innovations available to the firm, when combined with its monopoly status in the market, implied that there were financial resources available for many diverse purposes. I believe that there is a substantial amount of truth in this simple hypothesis although it needs some elaboration.

First, the available technology and its changes were provided to the firms in useable form that did not create serious difficulties for the management. Second the monopoly status and the lack of any close substitutes for phones ensured that there was a market available for the services of the government enterprises. Third, the cost reducing flow of innovations provided the management with the financial means of implementing some non-commercial goals.

4. THE ORIGINS OF THE WESTERN PROVINCIAL TELEPHONE COMPANIES

4.1 INTRODUCTION

This section provides some perspective on the origins and historical evolution of the western Canadian telephone companies that are government enterprises. It is necessary to consider this history. Many of the major decisions about these enterprises were made many years ago. First, there has been no recent clear enunciation of the purposes or goals of these companies.[15] Second a striking feature of all these companies is that there has been very little controversy about their continued existence. The possible exception is Edmonton Telephones but the only alternative that has had any serious consideration is the amalgamation of this company with AGT, another government enterprise. There have not been serious attempts to move these enterprises back into the private sector[16].

In telecommunications, unlike electric utilities, the private sector has dominated the industry. Although rural telephone cooperatives have been a rich part of the history of the telephone industry in both the United States and Canada,

---

[15] There are statements in annual reports and government documents but they are very vague and general.

[16] At times, the Provincial governments have been right wing, although populous in nature.

there have been very few major government enterprises in the telephone industry that have served both large rural and urban areas. Most of the government enterprises in North American telecommunications have been small rural systems.

Why did government enterprises form in western Canada and not in similar areas of the United States?[17] We do not have an answer but I believe it is another example of the difficulties that exist in establishing the reasons for the timing and location of government enterprises[18]. There is almost no uniform consistent theory about their formation in this industry or others.

There is no attempt at original historical research in this paper. Rather we have tried to look at the origins of each of the four government enterprises in the telephone industry and to describe the situation that led to their formation. This will leave many questions unanswered but it will aid us as a first step in understanding these enterprises. The available historical research is quite limited.

---

[17] An analysis of the radical nature of Prairie politics in Canada relative to the U.S. is contained in Lipset(1967).

[18] A discussion of this issue is contained in the Chandler paper in Pritchard(ed.) (1983).

Each company will be discussed separately beginning with 'edmonton telephones', followed by AGT, SaskTel and Manitoba Tel. There are sufficient similarities in their experience that we will review some companies in more detail than others.

4.2 A Brief History of Edmonton Telephones

On December 19, 1904, the ratepayers of Edmonton voted 661 to 63 to purchase, for $17,000, the assets of the Edmonton District Telephone Co. and approved the expenditure of an additional $10,000 to improve the system. At the time, the system was very small by modern standards. There were 390 subscribers connected to the eight switchboards with a capacity of 425 phones. The complete network had 150 miles of wire. The yearly rates were $36 for a commercial phone and $25 for a residential phone. This purchase was the culmination of negotiations between the Town and the original private telephone company. The Town's purchase was motivated by the desire to keep Bell Telephones out of the Town of Edmonton.

The first Edmonton telephone system had been started in 1885 by Alex Taylor. The Edmonton District Telephone Co. had been incorporated in 1893 and obtained a ten year franchise from the Town of Edmonton to operate a telephone system. By the early years of the 90's, telephone construction in Alberta was being undertaken by the territorial government and by Bell. There was increasing concern by municipal

officials, the public and Taylor that a Bell monopoly was slowly developing. Bell was very unpopular due to its attempts to push the Canadian government into agreeing to exclusive rights for Bell to provide telephone services, to give Bell power to set up lines without local permission and the attempt to obtain exclusive telephone rights in railway stations for Bell.

At this time, there were other municipal telephone systems in existence and Edmonton already operated a municipal electric power company. There was a belief by many citizens that municipalities could successfully operate a telephone company and other utilities and that these government enterprises would make money for the town. This income would be used to keep down the municipal tax rate. There was also a complementary fear that monopolies, like Bell or the CPR, meant high rates and poor service. The truth of these propositions is unimportant. These were the fundamental reasons for the Town seeking ownership of the existing system. Two other factors were important. First, the rate of population growth in Edmonton was very high. The existing telephone company did not have the capital resources to adequately finance either the expansion of or improvements to the system. It was feared that outside capital would be expensive due to the risks of competing with Bell. As a consequence, telephone rates would have to rise. The risks were very real since Bell was building a long

distance line connecting Calgary to Edmonton. Along the route, Bell was offering to construct municipal systems in towns that wished to be connected. Bell had substantial power to operate without municipal consent in any town and its true intentions, vis a vis the existing telephone systems, were not clear. The Edmonton municipal government felt that the only solution was the creation of a municipally-owned telephone system.

Once the town owned the system, it had to decide what to do with the portions of the existing network that spread far beyond Edmonton. Edmonton attempted to reorganize the existing system to create a joint-municipal system that would be owned by all the municipalities in the system. This was part of a continuing attempt by the Town and others to develop municipal systems for local services and a Provincial government system for long distance service. Edmonton's plans, and others like it, did not succeed due to the concerns of the smaller municipalities that they would be dominated by the larger urban centers. During the next few years, Edmonton sold the portions of its original system that were outside the town, to the Provincial government.

In 1890, Edmonton had a population of about 500 people. By 1907, the population had grown to over 11,000 and was expanding by more than fifteen percent a year. At this time, the number of phones was only 650, but this total would soon grow at annual

rates approaching fifty percent a year. The municipal telephone system was attempting to keep up with the rapidly growing demand and to decide on upgrades to the existing system.

Primarily, this was a choice of manual versus the new automatic exchanges. Bell did not own the patents on the new automatic exchanges which had been developed by a Kansas City undertaker who felt that the telephone operators were favouring his competition. Bell offered only manual exchanges but two other automatic systems were given detailed consideration. The nature of the cost differences can be illustrated. The Strowager automatic system had a capital cost of $40 per telephone line compared to $27 per line for the Bell manual. For the planned system, the operating costs for the manual would be $17.7 thousand with 43 employees. The comparable figures for the automatic were $8.1 thousand and 14 employees. While telephone technolgy was relatively simple it was often unreliable. Manual systems often had daily trouble calls that averaged eight percent of the total system phones. Edmonton adopted a Strowager automatic system which experienced trouble calls at a much lower level than eight percent.

While the new municipal system was struggling with growth, the threat from Bell continued until the Alberta Government won a war of telephone construction with Bell in 1908. During

the battle, Bell threatened to invade Edmonton and enter into direct competition with the municipal phone system.

Initially, the telephone system was a department within the town government. By 1912, the accumulated surplus of the system was $36 thousand, the rates were $20 a year for residences and $30 a year for businesses and there were seventy-four employees. Rates were increased in 1914 and again in 1922, the residence rate was $30 and the business rate $60 in 1923. One can observe the sharp increase in the spread between business and residential rates that occurred during this period.

Edmonton Telephones was the first of the government enterprises in Western Canada's telecommunications industry. There are facets of its origins that will be repeated in the history of all of the companies. There are unique aspects that will raise some questions which will be discussed here.

None of the other major prairie[19] municipalities bought or created municipal telephone systems that survived over long periods. There is no simple answer to why Edmonton was different. It was certainly abetted by some unique telephone pioneers like Alex Taylor. There does not seem to be a lesson

---

[19]There are municipal systems in Thunder Bay, Ont. and Prince George, B.C.

for government enterprises in general from the simple existence of Edmonton Tel[20].

Edmonton Tel has several important features for the study of government enterprises. First, one can argue that it has remained more completely integrated into the municipal government than our other firms. This suggests that adequate control of government provided telecommunications services does not require the organization of a separate enterprise in all cases. Edmonton has tried to use the partial integration as a source of cost saving by sharing resources. The size of the government and the geographical area served has certainly aided in the feasibility of Edmonton's organization. Second, Edmonton did not have the early financial problems that faced some of the government enterprises. This suggests that it was the pursuit of rapid expansion in expensive service areas combined with inadequate financial systems and a desire to simultaneously lower rates that created most of the early problems.

---

[20]Edmonton Tel does confirm the feasibility of separate urban systems for local networks.

4.3 Alberta Government Telephones

Alberta Government Telephones (AGT) was formed in 1908. This was shortly after Edmonton had purchased their telephone system and only two years after Alberta became a separate Province. Although the stories of the two government enterprises in Alberta's telecommunications industry are linked there are some distinct and important differences.

Bell began services in Alberta in 1885. In 1892, Bell managed to obtain from the Federal Government a Dominion charter which granted the company the rights to place telephone poles on any main street in Canada. This was an enormously valuable right. While other companies could obtain similar rights, other levels of government could not deny this right to Bell. A comparison with the current or recent local battles over municipal franchising for cable TV in the U.S. should convince you of the worth of this type of right. The granting of this charter was not popular in any part of Canada and the exact reasons underlying the Federal government's decision have never been revealed. Bell attempted to use this charter as a weapon in its battle to create a monopoly in Canadian telecommunications.

In attempting to develop telephone systems in Alberta, Bell had several difficulties to overcome. These were not

specific to Alberta since they arose in modified form in Manitoba and Saskatchewan. All of these provinces were formed in the early 1900's shortly after large numbers of rural settlers flowed in to open up farm land. Population growth was rapid and of very low density. Bell was a commercial company interested in profits. Low density rural routes are difficult to justify on a commercial basis. While Bell had rural routes in other parts of Canada, it is clear that the company's policy was to develop telephone systems where commercial prospects were most favorable, i.e. urban areas[21]. The public in Alberta wanted the benefits of telephones spread throughout the province. The involvement of the Provincial government in the development of the telephone system was predicated on this objective. This objective was not present in Edmonton. It was an objective that Bell could not profitably achieve and consequently, was unwilling to pursue seriously. Bell developed some municipal areas in Alberta and connected them with long distance lines. In doing this, Bell antagonized many municipal officials by using its Federal charter rights to compete with existing companies or more often to simply provide a credible threat before purchasing them. There were strong beliefs that the phone system should be a municipal enterprise, no different from water or electric power distribution. Fears of a private

---

[21]Rural systems were developed by Bell but the emphasis was on potentially profitable sights.

monopoly were particularly strong, given the example of the Western railroads.

During the initial period of Bell's telephone development in the West, there were no Provincial governments in the region. We do not know what might have happened had such governments existed. However, when the Provincial governments were formed, many of the new members of Parliament were former municipal officials who had experience with Bell at the municipal level. These members were often not supportive of Bell's efforts to control the telecommunications systems in Alberta or the other western Provinces.

As soon as the Province of Alberta was created, it entered into direct competition with Bell. It purchased, with great care, some private and municipal systems but only when there was no political opposition. The Province believed that the municipalities should run the local exchanges whenever possible. Toll lines were constructed by the Province in order to provide an alternative to Bell and to convince the company that the Province was serious. Rates on the government's toll system were thirty percent less than Bell's rates. The competition did not preclude limited system integration. For example, the government's toll lines were hooked into Bell's local exchanges in Calgary.

Bell responded to the government's activities by improving service, e.g. Calgary, and speeding up the building of its own local and toll systems. Towards the later stages of the competition Bell proposed a joint venture with the Province. The Province refused.

The willingness of the Province, with popular support, to build its own competing system finally resulted in the sale of Bell's system to the Province in 1908. The system that the Province purchased from Bell included 595 miles of lines and 2,270 subscribers.

AGT was formed after the Bell purchase. There were three principles. First, the Provincial system would provide all of the toll lines. Second, local exchanges would be provided by municipal systems unless the municipality wished the Province to undertake this task. Third, the Province would bring the benefits of telephones to the rural areas. This last objective would prove to be the most difficult but Alberta has consistently maintained its interest. The second objective was ultimately satisfied by the Province building local exchanges. The municipalities did not choose to provide their own local exchanges[22]. The first objective was fulfilled by the Province.

---

[22]Edmonton is an exception. The town did not want to join the Provincial system since it believed that Edmonton would be forced to pay for rural development.

4.3.1 Organization and Institution

AGT became a separate, proper Crown Corporation only in 1958, after fifty years as a semi-autonomous section within a department. The creation of a Crown Corporation was motivated by the difficulties of handling the financing of expansion within the government's existing financial framework. This was the first time in its history that AGT was a separate self-sustaining unit. Prior to this time, the Company was expected to cover costs but these were poorly defined or partially ignored when they were capital costs. Both the Government and AGT's management desired the new status. They hoped that this change in institutional status would clarify the definition of the rights and responsibilities of the Company while freeing it from the normal government administrative procedures, e.g. civil service rules, that previously applied. The Government would continue to fully back the debt of the Company.

4.3.2 Prices

The prices charged for telephone services have been a source of disputes throughout North America and Alberta is no exception. It should not be surprising that the costing procedures and pricing structure adopted by the Provincial phone system had much in common with those in other North American telephone companies. What distinguishes AGT and the other government enterprises from the regulated private

monopolies is their attempt to hold prices down, particularly in rural areas.

When AGT took over the Bell network and rapidly expanded within Alberta, prices were reduced. It rapidly became clear that these initial price reductions were not sustainable financially in the long run without permanent subsidies. There was no provision in the prices for depreciation, interest or the repayment of debt. Short run operating costs and a small portion of the other costs could be paid from revenues but the implied direct subsidies required to cover long-run costs were too large. It was politically painful to admit that the government enterprise could not produce lower prices than the old Bell Companies. Rates were increased in 1919, 1921 and 1926. The first two of these were certainly partly a correction of the excessive price reductions introduced when AGT was formed. In 1926, the rates were still lower than those charged by the private regulated monopolies.

For forty years, from 1926-66, there were no rate increases in AGT's territories. This is a rather astounding fact. The rate increases of 1966 were followed by further increases in the mid-seventies and eighties.

4.3.3 Rural Development

One of the main planks of the Alberta Government's telecommunications program was the rapid development of a rural phone network. This goal has been a part of AGT's mission even in the eighties. The implementation of this goal has been difficult as we will discover.

There were rural systems in Alberta before AGT was formed. These were often begun by enterprising individuals in a variety of portions of the Province. They were organized as coops generally. AGT initially spent considerable funds developing a rural network through the purchases of existing systems and the construction of new ones.

Most of this early development occurred prior to WWI. Eight years after the formation of AGT, 9000 farm households had been connected to the system, 4000 miles of toll lines existed and the total system had 36,000 phones. The war years, 1914-18, halted expansion. During the first three years after the war, the rural system doubled to over 20,000 farms and remained at that level until the end of the decade. The system did not have the money to continue its rapid expansion.

The depression brought a rapid decline in the rural network. Farmers were unable to pay their bills and were disconnected. The rural problems were increased by the decline in the physical condition of the rural network. The latter had never

paid for itself and the emphasis had been on expansion, not maintenance. The rural network was deteriorating physically and funds were not available to prevent it.

In 1933, the Province decided that the only course of action was to sell or give away the rural network to the farmers. It was hoped that they could provide low cost mutual systems. This policy was relatively successful. AGT's rural network had fallen from 20,000 to 8,000 subscribers by 1933. During the next three years, the mutuals raised this number back to 16,000. The quality of the service was low but the mutuals were able to provide very low cost service due to the free labour of the members. Most of the mutuals produced an adequate signal to permit hookups with the toll lines of AGT.

AGT did not return to the problems of rural phone development until the early sixties. The Province was much wealthier and the government was determined to return to the task of making telephones available throughout the Province. The magnitudw of the problem can be understood by noting that in 1957, only thirty-five percent of the occupied Alberta farms had telephone service.

In the sixties, AGT decided on a massive investment in rural telephones based on buried cables. Cables would be buried throughout the province to provide a maximum of

four-party service in all farm regions. This can be contrasted with the existing service which often had fifteen or twenty parties per line.

The decision to embark on the cable program followed attempts to strengthen the mutuals through grants. Some progress was made in terms of adding farm subscribers but a new set of technical difficulties was arising. The mutuals did not have the personnel to plan and implement a plant construction program that would fit easily into the long run development of the complete AGT phone system. The technology embedded in the latter was becoming more sophisticated. Early examples of the problems arose during attempts to introduce dial phones and automatic exchanges into the farm system. The outside plant of the mutuals was often inadequate for these improvements. The quality of the rural transmission was too noisyto permit integration with the new equipment. If the mutuals were forced into larger outside plant investments they would have to raise rates and therefore defeat the government's purpose by losing subscribers.

The Province finally decided that the continuation of a grant program to upgrade the mutuals could not succeed in the long run. The assistance to the mutuals had pushed the proportion of farms with phones from thirty-five to fifty percent. However, it had become clear that the mutuals were

not able to build and maintain a system which would permit full scale integration with the AGT system. It was decided to place the buried cable in the rural areas.

The decision to upgrade the rural areas was made by the government and was not desired by AGT. It was a social decision by the government which the company implemented. The new strategies had two components. Prices had to be kept low enough to make the telephone available to every farm. The size of the party lines should be as small as possible. The resulting program involved four party service and prices that implied that the farm sector would pay for none of the capital costs directly. By investing over $100 million, approximately fifteen percent of the company's total capital at that time, AGT brought modern telephone service to the rural areas of Alberta. It was recognized that the service would not pay for itself but would require continued subsidization from the rest of the system.

4.4 SASKATCHEWAN TELEPHONES

Our discussion of Sask Tel will be briefer than than the earlier discussion of 'edmonton tel' or AGT. Recall that these histories are selective since they are intended to portray the evolution of government ownership.

Sask Tel was formed in 1908 as a portion of the Saskatchewan Department of Railways, Telegraphs and Telephones. It became a Crown Corporation in 1947.

Telephones began to appear in Saskatchewan shortly after Mr Bell received his telephone pattern in 1876. The Bell and other companies were developing systems in the larger urban areas of Saskatchewan but the rural areas and smaller towns were not covered. Saskatchewan chose a slightly different route than Alberta when it began to pursue government telephone development. The Province was willing to operate a long distance system throughout the province and local services in urban areas. It was hoped that urban services would be provided by the municipalities and legislation was passed to permit and encourage this form of service provision. The 'Rural Telephone Act' of 1908 outlined the rights of farmers in rural areas to create and operate farm telephone coops. Saskatchewan wanted to develop the rural network but it was not going to develop it directly through the government.

Farm coops with government consent and assistance would have to be the mechanism. The process worked quite well. From 1919-1931, the rural coops had more telephones than the government. For example in 1921, the 1,172 coops had over 58,000 subscribers.

The government assisted and monitored the rural systems by providing training schools, installing and maintaining Central Offices and paying commissions on calls. During the last half of the twenties, the rural telephone system provided service to over half the farmers, which was the largest percentage in North America.

The depression years were a disaster throughout the Prairies and all of the Saskatchewan telephone systems suffered severely. The number of subscribers dropped by about thirty percent and the number of toll calls by over fifty percent. At the end of the thirties, the number of subscribers was still twenty percent lower than at the end of the previous decade.

After WWII, telephone development accelerated. The rural network, initially based on the coops, was finally absorbed into the Sask Tel network. Sask Tel, like Alberta, buried cable throughout the rural areas during the seventies. There are several aspects of the developments in Sask Tel that are interesting for our purposes. First, Sask Tel has been

directly involved in the distribution of television signals throughout the province. Sask Tel owns most of the cable for the major distribution to local cable operators. Second, in the eighties, Sask Tel has been constructing the first large scale fibre optics network in North America.

4.5 MANITOBA GOVERNMENT TELEPHONES

The early history of telephones in Manitoba has many similarities with the developments in Alberta and Saskatchewan. Bell Telephone entered Manitoba in 1881 by purchasing a small system already operating in Winnipeg. In 1899, the Manitoba government passed an amendement to the Municipal Act permitting the formation of municipally-owned telephone systems. The town of Neepawa immediately constructed a municipal system. Bell did not permit the connection of this or other municipal systems to Bell's growing toll system. At the same time there was considerable discontent in Manitoba over the pace of telephone development and the policies of Bell. This created the forces which would lead to the new government enterprise.

By 1906, Manitoba was prepared to establish a provincial telephone system. There was a Provincial government preference for Municipal telephone systems providing the local exchanges with Provincial backing for the debts of these municipal telephone enterprises. Plebiscites on municipal ownership were held in all municipalities. While forty percent of the municipalities supported municipal ownership there were difficulties with the Provincial plan. The Provincial government was proposing to operate the existing local exchanges in the three largest urban areas. The remainder of the municipalities were critical of the financial implications of

this ownership. It was felt that the Province was favoring the large urban systems at the expense of the smaller municipalities. The Province was unable to find a suitable arrangement with the municipalities. Consequently, municipal systems were never widely instituted in Manitoba.

Manitoba tried to expropriate Bell but was prevented by the Federal Government. After the Provincial government built some parallel lines to directly compete with Bell, the latter decided that it should sell its Manitoba system. In January of 1908, the Manitoba government purchased the Manitoba Bell system for 3.3 million dollars.

Manitoba Government Telephones expanded the telephone network rapidly after it took over the system. Rates were reduced by 16 to 28 percent. The rapid expansion, combined with the reduced rates, led to financial difficulties. The accounting system did not properly account for the fixed capital costs of the system. At the same time there were allegations that political motivations were involved in the allocation of contracts and the purchase of supplies.

At its inception, a three man management Commission, appointed by the Government, operated the Manitoba telephone system. While they had explicit powers to hire employees, set rates and connect subscribers, they required the Minister of

Telephones and Telegraphs's permission to purchase supplies. Thus the powers of the Commission were limited. When the Commission attempted to raise rates in 1911 and to revise the accounting system to properly account for capital costs, there were sharp public protests. A public enquiry was set up and the three Commissioners ultimately resigned. It is clear that they were used to absorb criticism that should have been directed at the government. The latter interfered in rate setting, the rate of system expansion and the details of the construction program. The failure of the accounting system was a failure of the government accounting system to properly account for an on-going business with large capital costs.

The re-organization created a Public Utilities Commission with a single commissioner who was responsible for the telephone system. Rates were raised in 1912 to place the system back in financial health.

Rates were raised by a further twenty-eight percent in 1921 and then were not raised again until 1955. Another twenty years would pass before further rate increases occurred during the seventies.

The similarities of telephone development in Manitoba and

the remainder of the Western Provinces were numerous and in the last segment, these patterns will be discussed.

4.6 LESSONS FROM THE PAST

The early history of the Western Provincial telephone companies is not documented in a large body of historical research. This is unfortunate because many case studies are needed if we are to unravel the situations in which government choose to create government enterprises to supply goods and services. I am going to draw out a plausible explanation but I must emphasize that many of the points need much more confirmation.

1. The North American telecommunications industry is relatively unique in its use of private companies to supply telecommunications. The rest of the world has used government enterprises to control telephone monopolies. The North American pattern is predominantly a consequence of the anti-government ideology that is prevalent here. However, there has always been ambivalence about the best method to control monopolies in transportation and utilities. The history of the United States and Canada diverge in this regard since the choice of government supplier has been much more common in Canada. In the United States, there are still many examples in the utilty and transportation industries in which government enterprises are used in some jurisdictions

and private enterprises in others. In North America, particularly Canada, it takes a special set of circumstances for government enterprises to be chosen over the prevalent assumption that private enterprise should be the supplier. It should not be imagined that these circumstances can be tightly specified without more research. However, the following points are important. The private sector must be perceived by a politically significant portion of the population to be incapable of providing the service in an acceptable form. The variety of cases covered by the terms 'acceptable form' may be large. Two general types stand out. First, the private sector may be unable to start or expand the industry on its own without government capital. Second, the ongoing operation of the industry by the private sector may be inadequate in price, quality, service or some other dimension. In this case, it is crucial that the politicians feel that they can not avoid the problem.

2.All of the Western telecommunications companies arose in somewhat similar circumstances. The area was beginning to experience rapid population growth and new political institutions were developing. Population settlements were relatively small and widely spread. It was not a market in which private enterprises, searching for profits, would expand telecommunication services rapidly. Moreover, unlike some parts of North America, there were no competing private

suppliers. Bell Telephones was the only major private company[23]. Its prospects were damaged by attempts to use the Federal government to secure a favourable position for itself. All these factors influenced the western governments although none was solely responsible. The governments were in a position in which the populous was opposed to the private supplier and in which public provision was perceived to be a cheaper alternative which would bring the wonders of the telephone to the newly opened Prairies.

3. Could Bell have succeeded in preventing the establishment of the government enterprises? There were certainly alternative strategies which the company might have chosen. One can not establish unequivocally whether these strategies would have worked. The main issue that underlay the creation of these enterprises was a divergence between the commercial expectations of Bell and the expectations of many of the politicians and the general public. It is not sensible to believe that Bell should have pursued these telephone markets at any costs. The costs for Bell became very high as the history evolved and it is unlikely that the creation of government enterprises could have been prevented. Why the American history in the Dakotas and other similar states was different is not known.

---

[23]There were small private companies but none in the West with the capabilities of competing with Bell.

4. Almost all of the companies **underestimated** the costs of running a telephone system. This does not imply a strict business error. To an extent that is hard to quantify, it was an error based on political considerations. Attempts to provide telephone services at very low prices foundered on the divergence between political will and true economic costs.

5. Organizational problems were not anticipated and the provincial telephone systems began as departments and only slowly shifted to separate enterprises.

6. Edmonton Telephones is unique in remaining a department rather than a separate enterprise.

7. Problems arose with the standard government accounting procedures that hastened the shift from department to separate enterprise. The difficulties were with the failure to have proper capital accounting and with civil service regulations.

8. Political interference was a problem in some of the systems in the early period.

5. FINANCIAL PERFORMANCE AND ITS IMPLICATIONS

5.1. Introduction

In this section, we will consider the evidence on the financial performance of the Crown Corporations in the Western Canadian telephone industry. To provide some perspective on the government enterprises, the data[24] to be analyzed will include three private firms in addition to the four public ones. The public firms, AGT, Sask Tel, MTS and 'et' are analyzed in conjunction with Bell Canada, British Columbia Telephones (BCTel) and Maritime Telephone and Telegraphs (MT&T). Our primary interest is comparing the differences in financial performance amongst the public companies and between the private and public companies. Some of the differences arise because of the nature of the networks that each company provides. For example, 'et' is urban based. The three other public companies have contended with the development of rural systems as part of their heritage since formation. How have the rural networks altered the performance of the Provincial companies relative to 'et'?

---

[24] Most of the data are derived from the Department of Communications compendium ,listed in the bibliography,since this reduces the non-comparability of direct company data.

Bell Canada is the giant of Canadian telecommunications and it is included for exactly that reason. If size makes any difference we may be able to perceive the affects at Bell[25]. BCTel is slightly larger than the largest government enterprise, AGT. If 'et' is included with AGT, their combined size is very close to BCTel. MT&T is a smaller, more rural system in Nova Scotia and it has a size that is not very different from Sask Tel and MTS. Comparisons are not restricted to the size groupings but we did want some size variation in the private firms that would roughly match the variation in the size of the government enterprises.

All of these companies are monopolies, or have been until very recently, and their rates are regulated[26]. There are no competitive firms providing basic telephone services. Differences in the firms must arise because of differences in the regulatory environment or the responses of the firm to conditions in their differing markets.

---

[25]For a network, size is a deceptive notion. All of the North American companies are interconnected. The density of the local loops may well be more important

[26]The form of the regulation differs but rates are never strictly a matter of company policy alone.

5.2. Basic Operating Results

Data has been compiled for the period 1975-82 for the seven companies. Table One presents the operating revenue, operating expense and net operating revenue for the seven companies. At the bottom of each table segment, the ratio, labelled GROWTH, equals the value of the variable in 1982 relative to 1975[27]. This Table provides a summary of the operating information but we will have to consider more detailed tables to understand the differences. The relative size of the companies, measured by revenue can be confirmed from Table One.

Three of the four government enterprises stand out (in Table One) as the firms that have been growing rapidly. AGT, Sask Tel and 'et' had the fastest growth in both revenues and expenses. The other government enterprise, MTS had the slowest growth in both revenues and expenses but the fastest growth in net revenue.

Since the prices of identical services vary widely amongst these companies, a size comparison based on revenues is slightly misleading. Two alternatives, which have their own limitations, are the number of telephones and the number of employees. Table Two shows the level and rate of growth of these variables in the top two panels. The bottom panel shows the ratio: telephones per

---

[27] In some cases the average value of the variable is given.

TABLE ONE

INCOME STATEMENTS
TOTAL OPERATING REVENUE
(THOUSANDS, DOLLARS)

		AGT	BELL	BC	EDM	MAN	MARI	SASK
(A)	1975	239786	1665870	360687	43332	91274	90621	92103
	1976	307801	1903924	435834	57576	110347	111695	115589
	1977	367810	2133415	501554	70877	132276	129655	135562
	1978	443471	2497430	550974	84101	148178	149206	164399
	1979	529018	2817108	675265	98099	170203	166924	197265
	1980	636828	3203116	754490	110649	198390	181564	225160
	1981	734462	3845100	894300	123701	221073	207302	267620
	1982	825346	4359300	1009400	153547	244554	235861	295705
	GROWTH	3.44	2.62	2.80	3.54	2.68	2.60	3.21

TOTAL OPERATING EXPENSES
(THOUSANDS, DOLLARS)

		AGT	BELL	BC	EDM	MAN	MARI	SASK
(B)	1975	197557	1175693	254341	33079	74464	62484	67316
	1976	245002	1372123	313138	41549	87741	74754	83334
	1977	288177	1572495	358453	51622	100234	85979	98792
	1978	338838	1784497	393535	57793	113240	99563	117242
	1979	407616	2054466	479100	68479	134186	111801	139856
	1980	498153	2390316	533375	80901	142961	122046	162942
	1981	596546	2818100	643100	96658	164616	142019	199938
	1982	690577	3254200	741300	116595	196807	154418	229305
	GROWTH	3.50	2.77	2.91	3.52	2.64	2.47	3.41

NET OPERATING REVENUE
A(THOUSANDS, DOLLARS)

		AGT	BELL	BC	EDM	MAN	MARI	SASK
(C)	1975	42229	490177	106346	10253	16810	28137	24787
	1976	62799	531801	122696	16027	22606	36941	32255
	1977	79633	560920	143101	19255	32042	43676	36770
	1978	104633	712933	157439	26308	34938	49643	47157
	1979	121402	762642	196165	29620	36017	55123	57409
	1980	138675	812800	221115	29748	55429	59518	62218
	1981	137916	1027000	251200	27043	56457	65283	67682
	1982							
	GROWTH	3.27	2.10	2.36	2.64	3.36	2.32	2.73

employee. This data must be used with some caution. With the advent of competition in the equipment market, the number of company-owned telephones becomes a poor indicator of the size of the network. Currently, many phones are not company-owned but the companies do not know the exact number of subscriber-owned phones. This will effect the numbers in Table Two for the eighties, but not earlier. Companies are slowly changing over to measure the number of subscriber lines[28] rather than the number of phones but consistent data for all companies is not yet easily available.[29]

Employees includes employees used for capital construction, particularly installations. As a consequence, faster growing companies will have more employees to handle the growth than a company of the same size with less growth. Edmonton Tel presents some special difficulties since some of its activities are carried out jointly with other parts of the City government. The data will underestimate the Edmonton Tel employees. The fact remains that Edmonton Tel is an urban network and the large number of telephones per employee reflects the urban nature of the network.

---

[28]Counting lines or telephones is not as simple as it might seem. Telephones are main stations, excluding extensions. Lines are roughly equivalent to phone numbers.

[29]There is a clear break in the telephone series for BCTel after 1980.

TABLE TWO

TELEPHONES
(NUMBER)

		AGT	BELL	BCTEL	EDMON	MANI	MARI	SASK.
(A)	1975	787825	7888581	1473183	329239	551601	392441	421792
	1976	856761	8201433	1513310	349393	578389	415125	451685
	1977	930382	8620229	1600512	373959	609161	431129	516312
	1978	1017254	8945400	1683421	405139	640253	451629	551053
	1979	1116604	9221800	1786648	436687	663452	474308	584456
	1980	1218356	9548100	1893355	468442	687121	498239	618614
	1981	1333358	9609400	1311000	497694	712983	519320	652009
	1982	1302519	9432000	1326000	496951	736710	532470	677963
	'75-'82 GROWTH	65.33	19.57	-9.99	50.94	33.56	35.68	60.73

EMPLOYEES
(NUMBER)

		AGT	BELL	BCTEL	EDMON	MANI	MARI	SASK
(B)	1975	9572	44904	13122	1485	4928	3526	3344
	1976	9958	48133	13749	1585	4665	3447	3622
	1977	10357	50350	13274	1696	4703	3446	3820
	1978	10696	53328	13925	1655	4718	3551	3957
	1979	11229	56128	14705	1731	4635	3621	4024
	1980	12326	57267	15120	1739	4789	3578	4339
	1981	13429	58659	14406	1825	4677	3597	4564
	1982	12814	55761	14063	1848	4636	3375	4578
	GROWTH '75-82	33.87	24.18	7.17	24.44	-5.93	-4.28	36.90

TELEPHONES/EMPLOYEE
(NUMBER)

		AGT	BELL	BCTEL	EDMON	MANI	MARIT	SASK.
(C)	1975	82.31	175.68	112.27	221.71	111.93	111.30	126.13
	1976	86.04	170.39	112.25	220.44	123.98	120.43	124.71
	1977	89.83	171.21	120.57	220.49	129.53	125.11	135.16
	1978	95.11	167.74	120.89	244.80	135.70	127.18	139.26
	1979	99.44	164.30	121.50	252.27	143.14	130.99	145.24
	1980	98.84	166.73	125.22	269.37	143.48	139.25	142.57
	1981	99.29	163.82	91.00	272.71	152.44	144.38	142.86
	1982	101.65	169.15	94.29	268.91	158.91	157.77	148.09
	GROWTH '75-'82	23.50	-3.71	-16.01	21.29	41.97	41.75	17.41

TABLE THREE

TOTAL OPERATING REVENUE
(THOUSANDS, DOLLARS)

		AGT	BELL	BC	EDM	MAN	MARI	SASK
(A)	1975	239786	1665870	360687	43332	91274	90621	92103
	1976	307801	1903924	435834	57576	110347	111695	115589
	1977	367810	2133415	501554	70877	132276	129655	135562
	1978	443471	2497430	550974	84101	148178	149206	164397
	1979	529018	2817108	675265	98099	170203	166924	197265
	1980	636828	3203116	754490	110649	198390	181564	225160
	1981	734462	3845100	894300	123701	221073	207302	267620
	1982	825346	4359300	1009400	153547	244554	235861	295705
GROWTH '75-'82		3.44	2.62	2.80	3.54	2.68	2.60	3.21

OPERATING REVENUE/TELEPHONE
(DOLLARS)

		AGT	BELL	BC	EDM	MAN	MARI	SASK
(B)	1975	304.36	211.17	244.84	131.61	165.47	230.92	218.36
	1976	359.26	232.15	282.40	164.79	190.78	269.06	255.91
	1977	395.33	247.49	313.37	189.53	217.14	300.73	262.56
	1978	435.95	279.19	327.29	207.59	231.44	330.37	298.34
	1979	473.77	305.48	377.95	224.64	256.54	351.93	337.52
	1980	522.69	335.47	398.49	236.21	288.73	364.41	363.97
	1981	550.84	400.14	682.15	248.55	310.07	399.18	410.45
	1982	633.65	462.18	761.24	308.98	331.95	442.96	436.17
GROWTH '75-'82		2.08	2.19	3.11	2.35	2.01	1.92	2.00

OPERATING REVENUE/EMPLOYEE
(THOUSANDS, DOLLARS)

		AGT	BELL	BC	EDM	MAN	MARI	SASK
(C)	1975	25.05	37.10	27.49	29.18	18.52	25.70	27.54
	1976	30.91	39.56	31.70	36.33	23.65	32.40	31.91
	1977	35.51	42.37	37.78	41.79	28.13	37.62	35.49
	1978	41.46	46.83	39.57	50.82	31.41	42.02	41.55
	1979	47.11	50.19	45.92	56.67	36.72	46.10	49.02
	1980	51.67	55.93	49.90	63.63	41.43	50.74	51.89
	1981	54.69	65.55	62.08	67.78	47.27	57.63	58.64
	1982	64.41	78.18	71.78	83.09	52.75	69.88	64.59
GROWTH '75-'82		2.57	2.11	2.61	2.85	2.85	2.72	2.35

There is a wide divergence between Bell, BCTel and AGT in the number of telephones per employee. Bell's ratio is quite high while the other two seem to be very low relative to the most companies. The limited data does not permit a detailed assessment. AGT is affected by 1)the rapid demand growth, 2)a policy of maintaining employees and 3) the rural network which it has to maintain without the support of Edmonton. These reasons do not really explain why AGT's results are so different from those of Sask Tel[30]. BCTel certainly has the most difficult terrain but to attribute the low figures entirely to terrain is probably incorrect. In the Vancouver metropolitan area, BCTel has quite a dense network and it is a large proportion of its system.

There are no available adequate measures of the physical network. It may be more useful to combine information from Tables One and Two to provide a better overview of the sharp differences between the companies. This is done in Tables Three and Four.

Operating revenue per telephone is shown in panel B of Table Three. The range across companies is enormous. In 1980, AGT received 551 dollars per phone while MTS and 'et' had 289

---

[30]The changing urban-rural split has made both companies more urban in the last quarter-century.

dollars and 236 dollars per phone respectively. The other four companies ranged between $336 for Bell and $398 for BCTel. MTS and 'et' were able to operate a telephone system with revenues per phone that are substantially smaller than average while AGT has revenues per phone that are enormously above average. Since the growth in revenue per phone has been similar across the companies, there is nothing special about the year 1980. Moreover, the similarity in the growth in revenue per phone implies that the sharp differences in the growth in revenues, in panel A of Table Three, are not due primarily to revenue growth differencials. They are due to differences in the growth of phones across companies.

Panel C, in Table Three, indicates the level and growth in revenue per employee. Since we know that revenue per phone varies sharply we wish to know if this is correlated with variations in revenue per employee. In 1980, the dispersion in revenue per employee is smaller than the dispersion of revenue per telephone and the distribution is different. AGT does not have a high value of operating revenue per employee as it did for revenue per phone. This simply reflects the low value of the phones per employee at AGT. MTS remains consistently low in revenue per employee as it was in revenue per phone. Edmonton Telephones has the highest revenue per employee which is a complete reversal of its position as the lowest company in revenue per phone.

TABLE FOUR

TOTAL OPERATING EXPENSES
(THOUSANDS, DOLLARS)

		AGT	BELL	BC	EDM	MAN	MARI	SASK
(A)	1975	197557	1175693	254341	33079	74464	62484	67316
	1976	245002	1372123	313138	41549	87741	74754	83334
	1977	288177	1572495	358453	51622	100234	85979	98792
	1978	338838	1784497	393535	57793	113240	99563	117242
	1979	407616	2054466	479100	68479	134186	111801	139856
	1980	498153	2390316	533375	80901	142961	122046	162942
	1981	596546	2818100	643100	96658	164616	142019	199938
	1982	690577	3254200	741300	116596	196807	154418	229305
	GROWTH '75-82	3.50	2.77	2.91	3.52	2.64	2.47	3.41

OPERATING EXPENSES/TELEPHONE
(DOLLARS)

		AGT	BELL	BC	EDM	MAN	MARI	SASK
(B)	1975	250.76	149.04	172.65	100.47	135.00	159.22	159.60
	1976	285.96	167.30	202.90	118.92	151.70	180.08	184.50
	1977	309.74	182.42	223.96	138.04	164.54	199.43	191.34
	1978	333.09	199.49	233.77	142.65	176.87	220.45	212.76
	1979	365.05	222.78	268.16	156.81	202.25	235.71	239.29
	1980	408.87	250.34	281.71	172.70	208.06	244.95	263.40
	1981	447.40	293.26	490.54	194.21	230.88	273.47	306.65
	1982	530.19	345.02	559.05	234.62	267.14	290.00	338.23
	GROWTH '75-'82	2.11	2.31	3.24	2.34	1.98	1.82	2.12

OPERATING COSTS/EMPLOYEE
(THOUSANDS, DOLLARS)

		AGT	BELL	BC	EDM	MAN	MARI	SASK
(C)	1975	20.639	26.182	19.383	22.275	15.110	17.721	20.130
	1976	24.604	28.507	22.775	26.214	16.808	21.687	23.008
	1977	27.824	31.231	27.004	30.438	21.313	24.950	25.862
	1978	31.679	33.463	28.261	34.920	24.002	28.038	29.629
	1979	36.300	36.603	32.581	39.560	28.951	30.876	34.755
	1980	40.415	41.740	35.276	46.522	29.852	34.110	37.553
	1981	44.422	48.042	44.641	52.963	35.197	39.483	43.808
	1982	53.892	58.360	52.713	63.093	42.452	45.753	50.088
	GROWTH '75-'82	2.61	2.23	2.72	2.83	2.81	2.58	2.49

TABLE FIVE

LOCAL REVENUE

		AGT	BELL	BCTEL	EDMON	MANI	MARI	SASK
(A)	1975							
	1976	90419	990259	187694	50935	37207	50678	34963
	1977	113227	1107640	216098	61553	49026	57293	42706
	1978	137901	1263096	241369	69523	53991	63183	51345
	1979	160400	1392707	263076	81663	58006	66968	59833
	1980	190507	1562498	286478	92096	68840	70481	67019
	1981	223759	1844100	345600	102043	76528	80024	76915
	1982	265510	2049700	424000	128270	83728	93945	85678
	GROWTH '76-82	2.94	2.07	2.26	2.52	2.25	1.85	2.45

TOLL REVENUE

		AGT	BELL	BCTEL	EDMON	MANI	MARI	SASK
(B)	1975							
	1976	208543	867679	235813	0	69674	58376	77864
	1977	243016	970453	270323	1233	79055	68862	89699
	1978	291869	1152507	318765	2652	88210	81412	108651
	1979	354046	1329670	371965	3003	103661	93854	130249
	1980	428443	1529014	442643	3196	119201	104171	149668
	1981	488746	1861100	521300	3394	132584	119676	179080
	1982	531545	2158000	555500	3345	147341	133176	193706
	GROWTH	2.55	2.49	2.36		2.11	2.28	2.49

TOTAL OPERATING REVENUE
(THOUSANDS, DOLLARS)

		AGT	BELL	BC	EDM	MAN	MARI	SASK
(C)	1975	239786	1665870	360687	43332	91274	90621	92103
	1976	307801	1903924	435834	57576	114347	111695	115589
	1977	367810	2133415	501554	70877	132276	129655	135562
	1978	443471	2497430	550974	84101	148178	149206	164399
	1979	529018	2817108	675265	98099	170203	166924	197265
	1980	636828	3203116	754490	110649	198390	181564	225160
	1981	734462	3845100	894300	123701	221073	207302	267620
	1982	825346	4359300	1009400	153547	244554	235861	295705
	GROWTH	2.68	2.29	2.32	2.67	2.22	2.11	2.56

The information on operating expenses in Table Four tends to follow the patterns in Table Three. AGT has high and MTS and 'et' low operating expenses per phone. On a per employee basis the distributions shrink and the companies shift their relative positions as they did for revenue.

The government enterprises do not form a homogeneous group. The urban system, 'et', has very different characteristics from the high cost and high revenue of AGT. Sask Tel appears to fit into the pattern of the private companies most directly. MTS is a low revenue and low cost company whose financial record is unique.

5.3 Sources of Revenue

The revenue for all the companies is derived from local services and toll revenue predominantly. Tables Five and Six provide evidence on the alternative sources of revenue and their recent growth. Local revenues have grown most quickly at AGT, 'et' and Sask Tel. Local revenues grow because of the growth in the number of telephones, changes in the level and mix of particular services purchased and changes in rates. We do not have information on the detailed product mix changes but we can separate out the growth in telephones. If we consider local revenues per telephone, this has grown by 78 percent at AGT, 73 percent at Bell, 67 percent at 'et', 68 percent at MTS, by only

36 percent at MT&T and by 52 percent at Sask Tel. AGT has had very fast growth in local revenue per phone as well as in local revenue[31]. For all of the companies, the growth in local revenue per phone dominates the growth in local revenues. Bell has had a relatively rapid growth in local revenue per phone to compensate for a low growth in phones whereas Sask Tel has had the reverse. MT&T stands out as the company whose local revenue growth per phone has been constrained, severely.

The growth in local service revenue does not portray the vast differences between the companies in the levels of local revenue per phone. In 1980, local revenue per phone was $156 at AGT, $164 at BELL, $151 at BCTel, $197 at 'et', $100 at MTS, $141 at MT&T, and $109 at Sask Tel. The very high value for 'et' reflects the urban network which it serves and the usual industry practice of pricing relative to the number of phones one can access. While 'et' does not have small local exchanges, the rates in Edmonton reflect the rates in Calgary[32]. The latter is part of AGT which prices according to access to phones. Two of the government enterprises, MTS and Sask Tel have very low local revenue per phone[33]. This reflects the deliberate attempt to

---

[31]Most of the population growth is inurban areas which increases the average revenue per phone.

[32]Both Alberta telephone companies have attempted to keep the rates approximately equal in the two largest Alberta cities.

[33]The rates in Regina and Winnipeg are particularly low.

TABLE SIX

OTHER REVENUE

		AGT	BELL	BC	EDM	MAN	MARI	SASK
(A)	1975							
	1976	8839	45986	12327	6641	3466	2641	2762
	1977	11567	55322	15133	8091	4195	3480	3157
	1978	13701	81827	-9160	11926	5977	4611	4403
	1979	14572	94731	40224	13433	8536	6102	7183
	1980	17878	111604	25369	15357	10349	6912	8473
	1981	21957	139900	27400	18264	11961	7602	11625
	1982	28291	151600	29900	21932	13485	8740	16321
	GROWTH	3.20	3.30	2.43	3.30	3.89	3.31	5.91

TOLL/TOTAL OPERATING REVENUE

		AGT	BELL	BC	EDM	MAN	MARI	SASK
(B)	1975							
	1976	67.8%	45.6%	54.1%	0.0%	63.1%	52.3%	67.4%
	1977	66.1%	45.5%	53.9%	1.7%	59.8%	53.1%	66.2%
	1978	65.8%	46.1%	57.9%	3.2%	59.5%	54.6%	66.1%
	1979	66.9%	47.2%	55.1%	3.1%	60.9%	56.2%	66.0%
	1980	67.3%	47.7%	58.7%	2.9%	60.1%	57.4%	66.5%
	1981	66.5%	48.4%	58.3%	2.7%	60.0%	57.7%	66.9%
	1982	64.4%	49.5%	55.0%	2.2%	60.2%	56.5%	65.5%
		66.4%	47.1%	56.1%	2.3%	60.5%	55.4%	66.4%

LOCAL/TOTAL OPERATING REVENUE

		AGT	BELL	BC	EDM	MAN	MARI	SASK
(C)	1975							
	1976	29.4%	52.0%	43.1%	88.5%	33.7%	45.4%	30.2%
	1977	30.8%	51.9%	43.1%	86.8%	37.1%	44.2%	31.5%
	1978	31.1%	50.6%	43.8%	82.7%	36.4%	42.3%	31.2%
	1979	30.3%	49.4%	39.0%	83.2%	34.1%	40.1%	30.3%
	1980	29.9%	48.8%	38.0%	83.2%	34.7%	38.8%	29.8%
	1981	30.5%	48.0%	38.6%	82.5%	34.6%	38.6%	28.7%
	1982	32.2%	47.0%	42.0%	83.5%	34.2%	39.8%	29.0%
	AVER.	30.6%	49.7%	41.1%	84.4%	35.0%	41.3%	30.1%

TABLE SEVEN

OPERATING INCOME/OPERATING REVENUE
(PERCENT)

		AGT	BELL	BC	EDM	MAN	MARI	SASK
(A)	1975	17.61%	29.42%	29.48%	23.66%	18.42%	31.05%	26.91%
	1976	20.40%	27.93%	28.15%	27.84%	20.49%	33.07%	27.90%
	1977	21.65%	26.29%	28.53%	27.17%	24.22%	33.69%	27.12%
	1978	23.59%	28.55%	28.57%	31.28%	23.58%	33.27%	28.68%
	1979	22.95%	27.07%	29.05%	30.19%	21.16%	33.02%	29.10%
	1980	21.78%	25.38%	29.31%	26.89%	27.94%	32.78%	27.63%
	1981	18.78%	26.71%	28.09%	21.86%	25.54%	31.49%	25.29%
	1982							
AV.		20.97%	27.34%	28.74%	26.98%	23.05%	32.63%	27.52%

OPERATING EXPENSES/OPERATING REVENUE
(PERCENT)

		AGT	BELL	BC	EDM	MAN	MARI	SASK
(B)	1975	82.39%	70.58%	70.52%	76.34%	81.58%	68.95%	73.09%
	1976	79.60%	72.07%	71.85%	72.16%	79.51%	66.93%	72.10%
	1977	78.35%	73.71%	71.47%	72.83%	75.78%	66.31%	72.88%
	1978	76.41%	71.45%	71.43%	68.72%	76.42%	66.73%	71.32%
	1979	77.05%	72.93%	70.95%	69.81%	78.84%	66.98%	70.90%
	1980	78.22%	74.62%	70.69%	73.11%	72.06%	67.22%	72.37%
	1981	81.22%	73.29%	71.91%	78.14%	74.46%	68.51%	74.71%
	1982							
AV.		79.03%	72.66%	71.26%	73.02%	76.95%	67.37%	72.46%

keep local rates low and to use toll revenues to provide sufficient total revenue to run the system. The fourth government enterprise, AGT has local revenues per phone that are similar to the private companies.

A final perspective on local services can be gained from panel C in Table Six. The government enterprises all receive a smaller portion of their total revenue from local services than the private firms.

The opposite perspective is portrayed in Panel B of Table Six which indicates the enormous importance of toll revenue to the Provincial government enterprises. All three receive more than sixty percent of their revenue from Toll services. Toll revenue, Table Five Panel B, has grown at rates that are not very different from local service revenue during this short time period. This is a reflection of the general economic difficulties during these years. During most of the post-WWII period, toll revenues have been growing much more rapidly than local revenues[34]. It is this spectacular growth in toll revenues that has permitted the local rates to advance slowly in all companies until at least the mid-sixties.

---

[34]For example, in 1963 MTS's toll revenue was less than forty percent of total revenue. In the next decade, Toll revenue grew by four hundred percent and local service revenue by eighty percent.

Toll revenue growth has been predominantly growth in toll revenue per phone. All of the companies, except for Bell and 'et', have had toll revenue growth per phone between 54 and 68 percent. Bell had growth of 109 percent and 'et' has no significant toll.

The levels of toll revenue per phone in 1980 were $352 for AGT, $160 for Bell, $234 for BCTel, $173 for MTS, $209 for MT&T and $242 for Sask Tel. AGT emerges, once again, as the company with large financial resources relative to all the other companies. Bell and MTS are the poor cousins. The other three companies are in between the very large range.

The diversity in the companies continues as we turn to consider the operating income that the companies achieved. This is presented in panel C of Table One. It will be most useful to consider the results for operating income as a portion of operating revenue as displayed in Panel A of Table Seven. Here we can see that the private and public companies almost divide into ownership groups. Most of the government enterprises have operating income that is a lower proportion of revenue than the private companies. AGT and MTS have had an average operating income ratio of 21 and 23 percent respectively. The private companies have had average ratios of 27, 29 and 33 percent for Bell, BCTel and MT&T respectively. Sask Tel and 'et' have ratios that are approximately equal to Bell. There should be no direct

TABLE EIGHT

OTHER INCOME
(THOUSANDS, DOLLARS)

		AGT	BELL	BC	EDM	MAN	MARI	SASK
(A)	1975	7831	145937	6657	883	3654	2249	1697
	1976	8072	65227	9694	1951	3336	1760	3034
	1977	6995	52961	9880	1127	4793	1274	5069
	1978	12984	63144	8877	425	6368	1008	3344
	1979	17331	131962	10795	-136	5987	1127	167
	1980	23600	112644	16799	154	9064	1597	807
	1981	39688	142000	12400	1096	8767	2563	6462
	1982							
GROWTH		5.07	0.97	1.86	1.24	2.40	1.14	3.81

NET INCOME
(THOUSANDS, DOLLARS)

		AGT	BELL	BC	EDM	MAN	MARI	SASK
(B)	1975	50060	636114	113003	11136	20464	30386	26484
	1976	70871	597028	132390	17978	25942	38701	35289
	1977	86628	613881	152981	20382	36835	44950	41839
	1978	117617	776077	166316	26733	41306	50651	50501
	1979	138733	894604	206960	29484	42004	56250	57576
	1980	162275	925444	237914	29902	64493	61115	63025
	1981	177604	1169000	263600	28139	65224	67846	74144
	1982							
GROWTH		3.55	1.84	2.33	2.53	3.19	2.23	2.80

INCOME TAXES
(THOUSANDS, DOLLARS)

		AGT	BELL	BC	EDM	MAN	MARI	SASK
(C)	1975		174243	31729			8141	
	1976		185825	35903			11224	
	1977		178593	42102			14278	
	1978		240118	46015			16953	
	1979		256370	65734			19033	
	1980		272561	76470			21500	
	1981		357800	78200			21627	
	1982							
GROWTH			2.05	2.46			2.66	

inference from these figures about the capabilities of the companies to earn a return on capital. Not only are they all regulated but the government enterprises can and do choose to limit their earnings.

The companies do receive income from other operations and the importance of other income varies across the companies. Net other incomes are shown in Table Eight, panel A. In 1980, net other income as a proportion of total net income was 14.5% at AGT, 12.2% at Bell, 7.1% at BCTel, 0.5% at 'et', 14.1% at MTS, 2.6% at MT&T, and 1.3% at Sask Tel. There is no common pattern between the private and public companies.

The final panel in Table Eight reminds us that the government enterprises do not pay income taxes. Within the industry, individuals in private conversations, have often suggested that this is a source of the low prices in the government enterprises. This is too simple. What is required is an analysis of the complete picture.

The initial portions of this section suggest a number of conclusions. First, there is very great diversity across the companies which does not lead to a narrow contrast between the private and public companies. Second, there are distinct aspects to several of the companies. MTS is a fascinating company. It has managed to operate a low cost and low revenue network which

TABLE 9: DEPRECIATION, MAINTENANCE AND TRAFFIC EXPENSES

(A):DEPRECIATION
(THOUSANDS, DOLLARS)

	AGT	BELL	BC	EDMON	MANI	MARI	SASK
1975	69688	338260	65914	8960	22016	18108	19269
1976	87269	381878	83195	11779	25226	21139	22759
1977	106566	427853	101210	15060	30030	24341	27392
1978	125068	473989	112619	15796	33674	27870	33095
1979	145980	530874	146106	18407	38551	29988	45859
1980	175773	586666	158507	22218	44876	32502	48244
1981	198937	646300	183500	27314	52919	35556	58012
1982	218137	760900	201800	32555	68776	40670	64960
GROWTH	3.13	2.25	3.06	3.63	3.12	2.25	3.37

(B):MAINTENANCE
(THOUSANDS, DOLLARS)

	AGT	BELL	BC	EDMON	MANI	MARI	SASK
1975	51798	274218	76567	10006	23022	14120	16552
1976	64449	308962	93307	11975	25437	18535	21770
1977	74423	372547	101334	14483	25890	19840	N/A
1978	86930	420182	100960	15545	29991	22940	N/A
1979	101230	464132	135533	18357	30403	26186	N/A
1980	123816	538426	155944	21179	35620	50838	65495
1981	144503	639600	N/A	24260	38093	63139	78210
1982	164490	710300	N/A	27493	43157	65858	88686
GROWTH	3.18	2.59	N/A	2.75	1.87	N/A	N/A

(C):TRAFFIC
(THOUSANDS, DOLLARS)

	AGT	BELL	BC	EDMON	MANI	MARI	SASK
1975	19238	97662	30340	1994	9849	8998	8308
1976	21317	106598	33126	2152	10409	8468	10055
1977	22471	116178	36342	2337	10309	8167	N/A
1978	24616	127413	39461	3244	10191	8657	N/A
1979	27414	135141	40652	3377	10135	9452	N/A
1980	29886	N/A	44392	3414	10876	N/A	N/A
1981	34799	N/A	N/A	4012	12240	N/A	N/A
1982	36516	N/A	N/A	3919	12993	N/A	N/A
GROWTH	1.90	N/A	N/A	1.97	1.32	N/A	N/A

is distinctly different from the other companies. AGT is positioned at the other end of the spectrum with high revenue and costs. 'et' appears quite different from the other companies but it is important for the perspective that it provides on the urban-rural issues. Third, the companies have chosen very different paths in using their financial resources. That is toll revenue is the key to some companies ability to offer low local rates but this can be supplemented by decisions about the net income required. The latter is dependent on the tax laws and the government's decisions about the payments required from the companies.

5.4 Expenditure Patterns

The information on expenditures may be broken down into a number of sub-classifications. Five categories will be discussed. They are Depreciatrion, Maintenance, Traffic, Marketing and Other Taxes. The three panels in Table Nine present expenditures on Depreciation, Maintenance and Traffic from 1975-82. Recall that operating expenses grew from two and one-half to three and one-half times during this time period. Most of the growth was growth on a per phone or per employee basis.

Depreciation is a large and interesting expense for all of these companies. In this time period, there were two

off-setting forces. Inflation tended to drive up current expenditures faster than depreciation which depends on historical costs. Due to technological and market changes, the companies were tending to shorten their lifetimes for equipment which accelerated the growth of depreciation. Four companies, AGT, Bell, MTS and SaskTel had growth in depreciation expenditures that were less than the growth in operating revenue. The other three companies had growth in depreciation expenditures that exceeded the growth in operating expenses. Depreciation is the largest single expense category, Table Ten, panel B. For all companies, depreciation tends to be about thirty percent of operating expenditures but there are some interesting departures from this pattern. Two private companies, Bell and MT&T, had the lowest depreciation proportions in 1982 and they have both seen this ratio decline quite sharply over this period. This is a mainly a consequence of regulatory constraints on increases in the depreciation rates and not other factors. The government enterprises have been able to alter their depreciation rates more freely than the regulated private firms. The rates have been increasing but there is no general evidence that depreciation expenses are out of line.

Maintenance is the other significant expenditure category. For each company roughly twenty-five percent of operating expenses are maintenance expenditures(Table 10, panel A). Maintenance expenditures are dominated by labour expenses. The growth in

TABLE TEN: OPERATING COST PROPORTIONS

(A):MAINTENANCE/OPCOSTS
(PERCENTAGE)

	AGT	BELL	BC	EDMON	MANI	MARI	SASK
1975	26.22%	23.32%	30.10%	30.25%	30.92%	22.60%	24.59%
1976	26.31%	22.52%	29.80%	28.82%	28.99%	24.79%	26.12%
1977	25.83%	23.69%	28.27%	28.06%	25.83%	23.08%	N/A
1978	25.66%	23.55%	25.65%	26.90%	26.48%	23.04%	N/A
1979	24.83%	22.59%	28.29%	26.81%	22.66%	23.42%	N/A
1980	24.86%	22.53%	29.24%	26.18%	24.92%	41.65%	40.20%
1981	24.22%	22.70%	N/A	25.10%	23.14%	44.46%	39.12%
1982	23.82%	21.83%	N/A	23.58%	21.93%	42.65%	38.68%
AV.	25.22%	22.84%	28.56%	26.96%	25.61%	N/A	N/A

(B):DEPRECIATION/OPCOSTS
(PERCENTAGE)

	AGT	BELL	BC	EDMON	MANI	MARI	SASK
1975	35.27%	28.77%	25.92%	27.09%	29.57%	28.98%	28.62%
1976	35.62%	27.83%	26.57%	28.35%	28.75%	28.28%	27.31%
1977	36.98%	27.21%	28.24%	29.17%	29.96%	28.31%	27.73%
1978	36.91%	26.56%	28.62%	27.33%	29.74%	27.99%	28.23%
1979	35.81%	25.84%	30.50%	26.88%	28.73%	26.82%	32.79%
1980	35.28%	24.54%	29.72%	27.46%	31.39%	26.63%	29.61%
1981	33.35%	22.93%	28.53%	28.26%	32.15%	25.04%	29.01%
1982	31.59%	23.38%	27.22%	27.92%	34.95%	26.34%	28.33%
AV.	35.10%	25.88%	28.16%	27.81%	30.65%	27.30%	28.95%

(C):OTHER COSTS/OPCOSTS
(PERCENTAGE)

	AGT	BELL	BC	EDMON	MANI	MARI	SASK
1975	38.51%	47.90%	43.98%	42.66%	39.52%	48.42%	46.79%
1976	38.07%	49.65%	43.63%	42.83%	42.26%	46.93%	46.57%
1977	37.20%	49.10%	43.49%	42.77%	44.21%	48.61%	N/A
1978	37.43%	49.89%	45.73%	45.77%	43.78%	48.97%	N/A
1979	39.35%	51.57%	41.21%	46.31%	48.61%	49.76%	N/A
1980	39.86%	52.93%	41.05%	46.36%	43.69%	31.71%	30.20%
1981	42.43%	54.37%	N/A	46.64%	44.71%	30.51%	31.87%
1982	44.59%	54.79%	N/A	48.50%	43.13%	31.01%	32.99%
AV.	39.68%	51.28%	N/A	45.23%	43.74%	N/A	N/A

TABLE 11: OPERATING COST ITEMS

(A):COMMERCIAL AND MARKETING
(THOUSAN

	AGT	BELL	BC	EDMON	MANI	MARI	SASK
1975	17258	91275	23426	3945	7074	5089	7239
1976	21153	104745	27543	4914	8778	6890	8799
1977	24601	122526	29440	5897	10789	7836	N/A
1978	29070	141307	46225	7304	12535	9065	N/A
1979	34789	164617	55866	8700	14185	10446	N/A
1980	44753	N/A	63064	10364	16365	N/A	N/A
1981	57676	N/A	N/A	13550	19492	N/A	N/A
1982	67261	N/A	N/A	16450	22578	N/A	N/A
GROWTH	3.90	N/A	A/A	4.17	3.19	N/A	N/A

(B):OTHER TAXES
(THOUSANDS, DOLLARS)

	AGT	BELL	BC	EDMON	MANI	MARI	SASK
1975	5013	96538	17694	2626	2604	2455	889
1976	6218	119227	22064	3335	2910	3083	1069
1977	7479	130036	24813	5399	3068	3549	N/A
1978	8760	140780	28390	6187	3148	4216	N/A
1979	9535	173750	30304	7175	3476	4563	N/A
1980	12607	206365	33494	8138	3673	N/A	N/A
1981	19134	247500	43700	9153	3815	N/A	N/A
1982	23524	288700	50400	11343	4398	N/A	N/A
GROWTH	4.69	2.99	2.85	4.32	1.69	N/A	N/A

(C):OTHER COSTS=OPCOSTS-(DEPR.+MAIN.)
(THOUSANDS, DOLLARS)

	AGT	BELL	BC	EDMON	MANI	MARI	SASK
1975	76071	563215	111860	14113	29426	30256	31495
1976	93284	681283	136636	17795	37078	35080	38805
1977	107188	772095	155909	22079	44314	41798	N/A
1978	126840	890326	179956	26452	49575	48753	N/A
1979	160406	1059460	197461	31715	65232	55627	N/A
1980	198564	1265224	218924	37504	62465	38706	49203
1981	253106	1532200	N/A	45084	73604	43324	63716
1982	307950	1783000	N/A	56548	84874	47890	75659
GROWTH	4.05	3.17	N/A	4.01	2.88	1.58	2.40

maintenance expenditure, Table 9, panel B,[35] has been less than the growth in total expenditures for all companies. Since inflation was driving up prices the growth in maintenance expenditures was slowed by improved equipment and maintenance procedures. Depreciation and Maintenance averaged sixty percent of total operating expenses at AGT, forty-nine percent at Bell, fifty-seven percent at BCTel, fifty-five percent at 'et' and fifty-six percent at MTS. There is no sharp distinction between the private and public firms. AGT has a very high and Bell a very low percentage, due to their depreciation policies.

Less complete and consistent information is available about the other three categories, Traffic, Marketing and Other Taxes. Traffic expenditures, Table 9, panel C, are the costs of handling, traffic which are largely operator wages. This is the expenditure category which used to be the largest single expenditure but whose growth has been slow in the last thirty years. Operators have been replaced by more automatic traffic handling equipment. For example, traffic was almost ten percent of AGT's costs in 1975 and had fallen to almost five percent by 1982. Once again, the government enterprises costs do not seem out of line relative to the private firms.

---

[35]For both MT&T and SaskTel there is a break in the maintenance series in 1980.

Since traffic expenses are becoming less important it must be items in other costs that are increasing rapidly. Total other costs, Table Eleven, panel C, have increased much more rapidly than total expenditures. Two items have contributed to this rise.

There has been a tendency for marketing expenses to rise as a proportion of total expenses. All the companies have become more market oriented. The evidence that we have for the public companies is in panel A of Table Eleven . These costs are now roughly twelve percent of total operating costs for some companies.

Taxes, other than income taxes have also been growing quickly, Table Eleven, panel B, for some companies. Particularly in Alberta, these have risen sharply. The level is very high in Edmonton because there is an explicit revenue tax.

It is not possible to look at more detailed expenditure items. The available evidence suggests great diversity amongst the companies but not a cleavage along public versus private lines. Taxes, the debt ratio and the cost of capital are three items that have been prominent in discussions of public enterprises and we will consider them in the following segments of this section.

TABLE TWELVE: DEBT AND CAPITAL

(A):DEBT-CAPITALIZATION RATIO
(PERCENTAGE)

	AGT	BELL	BC	EDM	MAN	MARI	SASK
1975	93.56%	47.29%	62.27%	83.37%	84.84%	55.55%	70.29%
1976	94.32%	47.74%	61.69%	86.09%	85.96%	52.58%	73.03%
1977	94.57%	49.09%	61.67%	86.23%	85.94%	48.78%	75.54%
1978	94.05%	50.59%	56.88%	85.73%	85.77%	46.52%	78.40%
1979	93.08%	48.34%	53.27%	84.39%	89.42%	49.11%	77.59%
1980	92.20%	49.19%	53.99%	83.38%	86.96%	50.85%	78.68%
1981	93.17%	49.39%	54.49%	87.09%	85.14%	52.80%	79.43%
1982	96.57%	47.19%	51.84%	88.50%	84.80%	50.84%	80.83%
AV.	93.94%	48.60%	57.01%	85.60%	86.10%	50.88%	76.72%

(B):DEBT SERVICES/NET INCOME
(PERCENT)

	AGT	BELL	BC	EDM	MAN	MARI	SASK
1975	105.38%	24.56%	41.91%	79.76%	96.07%	38.43%	42.56%
1976	97.53%	28.90%	42.13%	71.58%	88.22%	36.32%	45.99%
1977	95.60%	32.97%	41.94%	71.16%	74.90%	32.11%	56.88%
1978	86.51%	29.77%	41.55%	67.53%	83.35%	29.23%	61.45%
1979	82.43%	28.23%	34.81%	68.81%	126.86%	28.16%	56.15%
1980	84.75%	31.01%	34.41%	73.27%	79.56%	28.93%	60.63%
1981	99.41%	28.67%	37.97%	100.93%	79.38%	33.44%	67.21%
1982	130.48%	30.32%	41.83%	92.00%	89.62%	30.33%	88.45%
AV.	97.76%	29.30%	39.57%	78.13%	89.74%	32.12%	59.91%

(C):TAXES/NET INCOME
(PERCENTAGE)

	AGT	BELL	BC	EDM	MAN	MARI	SASK
1975	0.00%	27.39%	28.08%	0.00%	0.00%	26.79%	0.00%
1976	0.00%	31.13%	27.12%	0.00%	0.00%	29.00%	0.00%
1977	0.00%	29.09%	27.52%	0.00%	0.00%	31.76%	0.00%
1978	0.00%	30.94%	27.67%	0.00%	0.00%	33.47%	0.00%
1979	0.00%	28.66%	31.76%	0.00%	0.00%	33.84%	0.00%
1980	0.00%	29.45%	32.14%	0.00%	0.00%	35.18%	0.00%
1981	0.00%	30.61%	29.67%	0.00%	0.00%	31.88%	0.00%
1982	0.00%	28.65%	28.21%	0.00%	0.00%	35.19%	0.00%
AV.		29.49%	29.02%			32.14%	

5.5 Income Taxes and Government Enterprises

Government enterprises are not liable for income taxes. This is often mentioned as an unfair financial advantage for these enterprises compared to private firms. That is, the government enterprises are able to keep rates for telephone services low because they do not have income tax obligations. There is some merit to this type of argument and we wish to clarify the problems that arise due to the failure to include government enterprises in the income tax system.

There has been a long tradition of excluding government enterprises from the tax system. The rationale for this decision is that the governments would simply be collecting taxes from themselves or another level of government. To avoid inter-governmental conflicts there are reciprocal agreements that governments do not tax one another. The impact of this exclusion can be explored in a number of ways. We will begin with a straightforward calculation and then develop some finer adjustments.

Over the period 1975-82, the three private telecommunications firms, Bell Canada, BCTel and MT&T paid about thirty percent of their net income as income taxes. Since net income was roughly thirty percent of operating revenue, income taxes amounted to nine or ten percent of operating revenue.

Assuming no other changes, we could suggest that a ten percent reduction of all rates or a twenty percent reduction of only local rates would be feasible if the private firms did not pay income taxes. This would be a noticeable reduction. There may be significant problems with this suggestion as we will see.

Suppose we had considered taxing the government enterprises instead of dropping the tax for the private firms. Our conclusions would be very different. The government enterprises do not have large taxable incomes. Their very large debt to equity ratio ensures that most of their income is not taxable.

The difference in the debt-equity ratio between the government enterprises is greater than amongst the private firms. As a rough average, it is reasonable to state the following conclusion. If government enterprises were taxed, this would only require a four percent increase in their rates. The change would be larger for Sask Tel and smaller for AGT. This is much lower than the ten percent decline in the private firms' rates which might accompany the elimination of their income tax liabilities.

The difference in the results points out the importance of the sharp divergence in the debt-equity ratios of private versus public firms. This topic will be discussed below. The other contributing factor is the higher private ratio of net

income to operating income. The difference also illustrates the ease with which similar questions can be re-phrased to alter the numerical answers.

In a simple world of no changes other than the income tax, the rates for customers of private firms would fall significantly if the income tax were eliminated. It is also true that due to their debt structure, the imposition of the income tax on government enterprises would have a much smaller effect on their rates.

The initial discussion of the tax impact precluded any adjustments other than in the income tax. That is, the underlying assumption was that the tax was simply an extra cost which was passed on to the consumer with no demand effects. This may not be a poor approximation in the telecommunications industry although it is certainly incorrect in general. If the tax is not pushed forward onto the consumer where else can it be diverted. It is unlikely that the presence or absence of the tax has any major impact on the prices paid for either materials or labour. The telecommunications firms are part of larger markets in these inputs and consequently probably have little impact on their prices. The two areas with some possibilities are the equipment market and the cost of capital.

Prices in the equipment market, are probably, maybe certainly, not influenced by the absence of an income tax on the government enterprises. These firms are simply a very small segment of the market. The private firms, which are linked to equipment manufacturers, have often been accused of pushing profits though to their captured suppliers in order to avoid regulation. Attempts to prove these allegations have not been successful although the possibility remains open. Since the tax liabilities of the regulated operating company can be pushed forward it is unlikely that the regulated firm would be interested in pushing the tax liability onto the unregulated sector. For firms without a captured supplier, the size of the Canadian firms relative to the international telecommunications' equipment market makes it unlikely that prices are altered due to tax considerations.

The tax may have an effect on the cost of capital but it probably does not have an impact on the after tax rate of return[36]. If the government enterprises were taxed, which is highly unlikely, the probable response would be to drive the tax liabilities close to zero by increasing the debt-equity ratio and avoiding the tax. The private firms are regulated. Income taxes are accounted for as part of their costs. To the extent that the firms are given rates that permit them to earn their allowed cost

---

[36]This assumes that the regulator would not permit tax changes to alter after tax income.

of capital, income tax changes will simply be pushed through the rates in a positive or negative direction.

The absence of the income tax might seem to provide a means for government enterprises to lower rates. A more precise interpretation would be the following. The high debt to equity ratio of government enterprises isolates them from much of the impact of the income tax system. If private firms did not pay income taxes and retained the existing capital structure they could benefit their customers if the income tax were eliminated. It is the combination of the debt structure and the tax system in a regulated environment that permits the income tax to raise rates for the private firms.

There are two further questions about the income tax. First, the volume and timing of investment depend on the cost of capital. To the extent that the income tax alters the cost of capital, it will alter investment decisions. Consideration of this question is undertaken in another section. Second, the higher rates induced by the income tax system may have reduced the quantity of telephone services demanded. The magnitude of this effect is unknown but some qualitative comments can be made. Since the inter-provincial toll rates are almost uniform across Canada, either these rates have not been effected by the income tax or else some of the demand effects have been transmitted via these rates to jurisdictions without any income

tax. For local basic service, the demand is inelastic since calls are free once the flat monthly fee is paid. These factors suggest that the demand effects may have been fairly small.

In conclusion, we are accepting the argument that the income tax does push up rates for the private firms. For the government enterprises, the direct effects on rates, of their exclusion from income tax liabilities, is small. It is their debt structure that shields them from tax liabilities. Consumers are offered distorted prices by this structure. Telephone services, particularly local and intra-provincial toll services are relatively cheaper in jurisdictions with government enterprises. This price distortion is not desirable.

5.6 Choosing a Capital Structure

Government enterprises in telecommunications and other industries have very high debt-equity ratios. This has consequences for a number of questions that we have addressed in other sections. For example, the cost of capital will depend on the debt equity ratio. The level of this ratio has been a source of some concern in several of the companies. Are there any criteria that would suggest what the appropriate debt-equity ratio should be for a government enterprise or a regulated private firm?

The theory of the debt-equity ratio is a portion of the theory of the capital structure of the firm. In his recent Presidential address to the American Finance Assoc., Stew Myers (1984) discussed this area of Finance. Myers and Majluf (1985) have recently proposed some theoretical extensions that may improve our understanding. In his Presidential address, Myers concluded that this area of Finance was not in a very satisfactory condition. The theoretical developments were elegant but were not able to explain the behavior of firms. The primary theoretical models are extensions of the earlier work by Modigliani and Miller(1958) and Miller(1977). In these models the capital structure makes no difference except for the tax tradeoffs between debt and equity. That is, debt is attractive because the interest costs are tax-deductible. For a private firm, the objective is to maximize the value of the firm. Choosing an optimal capital structure when there is only debt and equity requires increasing the debt proportion until the costs of increased risks of financial trouble outweigh the tax-induced benefits of debt. While this model can be extended to cover many special features it has not been able to explain the observed diversity of capital structures in the private sector.

The alternative descriptive capital structure analysis accords well with the actual behavior of private firms but lacks a rigorous theoretical basis. Donaldson (1961) is an example of

an empirically based description of this theory.[37] Meyers has labelled this theory as the 'pecking order' theory. In this theory, managers prefer internal over external financing. If external financing is necessary, managers prefer debt over equity. This preference based theory accords with actual behavior but it is difficult to link this behavior with an objective of maximizing the value of the firm.

The problems of explaining the choice of a capital structure for private firms carries over to regulated firms and government enterprises. Specifying the objectives of government enterprises is difficult particularly if the objectives are to imply a criteria that will determine the optimal capital structure. If the objective were to maximize the value of the government enterprise, there would be little reason to seek an optimal capital structure based on taxes for which the firms are not liable. While regulated private enterprises may attempt to maximize the value of the firm and do pay taxes, the taxes are not a strong factor in the selection of the optimal capital structure. If taxes are passed forward as a cost by the regulatory commission, there is little incentive to increase the value of the firm by using debt[38].

---

[37] Meyers and Majluf (1985) attempt to provide a theoretical underpinning for this behavior

[38] The regulated firms have shown considerable strategic behavior in using deferred taxes.

Regulated firms appear to issue equity more often than unregulated private firms. This may be in response to regulation which prevents them from financing their investments internally combined with the firms' arguments that they must maintain a particular debt-equity ratio.

The government enterprises may reasonable be attempting to minimize the costs of providing services with some constraints on the employment decision which we will ignore for the moment.[39] Even in this simple case the choice of a capital structure requires that one know the cost of equity relative to debt. For a government enterprise there is considerable controversy about the cost of equity. We will discuss this controversy in more detail in a separate section on the cost of capital. For our purposes, assume that we know the cost of equity capital for the government enterprise and that the firm is to minimize costs subject to some non-commercial constraints. There may be no optimal capital structure. For a government enterprise with debt backed by the government,there are no financial risks to the owners, i.e. the government, associated with equity. We will conclude that the troubled conventional analysis of the capital structure of private enterprises does not yield much assistance

---

[39]The non-commercial objectives of the owning governments are assumed to be included in the specified service output.

in determining the capital structure of the government enterprise.[40]

In recent years, losses, after debt service payments, have been registered by some government enterprises and almost all of them have increased their debt to equity ratio. The 'red ink' is perceived to be a political and public relations liability for the management. If the debt-equity ratio were lower, positive net incomes would be achieved. These positive net incomes would not alter the financial performance of the firm but only its superficial appearance. While the criticism of managements' losses may be ill-informed, disguising performance by manipulating the capital structure does not necessarily help.

The magnitude of this problem can be seen in Table Twelve, panels A and B. AGT has a debt-equity level which averaged over ninety-three percent.[41] Debt servicing has absorbed almost all of AGT's net income. At MTS and 'et' the debt-equity ratio has averaged about eighty- five percent and debt service charges have absorbed an average of eighty-nine and seventy-eight percent, respectively, of net income. Only at Sask Tel, where the

---

[40]There is an exception to this conclusion. If the government enterprise is to mimic a private firm then it should have the capital structure of the private firm. This is discussed below.

[41]For our purposes, we are measuring total long term debt as a proportion of total capitalization.

debt-equity ratio has averaged seventy-six percent, have debt service payments absorbed less than sixty percent of net income.

The private companies have had much lower debt-equity ratios. This does not imply that their capital structures are optimal or that the government enterprises should mimic their capital structure. There does not seem to be an adequate theory of the capital structure for government enterprises but there are few sensible arguments for equity in a government enterprise.[42]

The capital structure narrowly defined may be an issue without as much important as it sometimes receives. However it is related to another series of issues concerning the cost of capital. These are important issues to which we now turn.

5.7 The Cost of Capital

The telecommunications industry is capital intensive and that intensity is growing. The appropriate costing of capital

---

[42]The most likely opposition to this claim is going to arise from those who believe that cost of capital for the government should be as high as for the private sector. These arguments will be discussed below. Even if valid, they do not require equity investment.

TABLE THIRTEEN: RETURNS TO DEBT AND EQUITY

(A): INCOME AFTER TAX/ TOTAL CAPITAL
(PERCENTAGE)

	AGT	BELL	BC	EDM	MAN	MARI	SASK
1975	5.59%	10.25%	7.96%	8.19%	6.67%	8.23%	9.64%
1976	6.78%	8.55%	8.21%	9.71%	7.35%	9.31%	10.43%
1977	7.39%	8.33%	8.51%	9.41%	8.81%	9.80%	10.21%
1978	8.84%	9.01%	8.73%	10.40%	8.87%	10.27%	9.92%
1979	9.28%	9.93%	9.36%	10.69%	7.12%	10.83%	10.53%
1980	9.87%	9.07%	10.20%	10.48%	11.18%	10.65%	9.96%
1981	9.39%	10.59%	10.56%	8.35%	10.92%	11.23%	10.50%
1982	8.72%	11.06%	11.94%	10.53%	9.55%	12.87%	8.69%
GROWTH	1.56	1.08	1.50	1.29	1.43	1.56	0.90

(B): AVERAGE INTEREST RATE ON DEBT
(PERCENTAGE)

	AGT	BELL	BC	EDM	MAN	MARI	SASK
1975	6.29%	7.33%	7.45%	7.83%	7.55%	7.78%	5.83%
1976	7.01%	7.52%	7.70%	8.08%	7.54%	9.05%	6.57%
1977	7.47%	7.89%	7.98%	7.76%	7.68%	9.45%	7.69%
1978	8.13%	7.67%	8.82%	8.19%	8.62%	9.69%	7.78%
1979	8.21%	8.13%	8.96%	8.72%	10.10%	9.38%	7.62%
1980	9.08%	8.10%	9.58%	9.21%	10.23%	9.35%	7.67%
1981	10.01%	8.86%	10.46%	9.68%	10.19%	10.44%	8.88%
1982	11.78%	9.96%	13.42%	10.95%	10.09%	11.85%	9.51%
AV.	8.50%	8.18%	9.30%	8.80%	9.00%	9.62%	7.69%

(C): INCOME AFTER TAX AND DEBT SERVICE/ TOTAL CAPITAL
(PERCENTAGE)

	AGT	BELL	BC	EDM	MAN	MARI	SASK
1975	-4.67%	12.87%	8.80%	9.97%	1.73%	8.79%	18.63%
1976	2.95%	9.49%	9.05%	19.85%	6.17%	9.58%	20.89%
1977	5.98%	8.75%	9.35%	19.71%	15.72%	10.13%	18.01%
1978	20.05%	10.37%	8.62%	23.64%	10.38%	10.76%	17.71%
1979	23.55%	11.62%	9.81%	21.37%	-18.07%	12.23%	20.60%
1980	19.29%	10.01%	10.92%	16.87%	17.52%	12.00%	18.38%
1981	0.82%	12.28%	10.68%	-0.60%	15.16%	12.11%	16.73%
1982	-77.51%	12.04%	10.35%	7.33%	6.52%	13.93%	5.24%

can make a difference for the prices charged to consumers. We have already discussed the income tax separately and in this section we will bring together the components of the cost of capital.

The potential cost advantage that government enterprise may have due to their exclusion from income tax liabilities can be extended to the other components of the cost of capital. Three components will be considered. They are depreciation, interest payments and the return to equity. For the last two components, government enterprises are often thought to have a definite cost advantage. The governments guarantee their debt which permits them to have lower interest payments. The equity portion of the government enterprises is very low compared to private firms. Since the cost of equity exceeds the cost of debt, this provides a cost advantage to the government enterprises.

The realized after tax return to capital is shown in Table 13, panel A[43]. The government enterprises have not had consistently lower realized returns compared to the private firms. AGT and MTS have had lower returns than the other firms but SaskTel and 'et' have had average returns above those of Bell and BCTel and only slightly below MT&T.

---

[43]In this calculation depreciation is included as an operating expense.

Consider the interest costs. In Table Thirteen, Panel B, the average debt costs for the companies are displayed. There is no clear advantage for the government enterprises relative to all the private enterprises[44]. The observed dispersion represents a combination of the government guarantees for the debt of the public firms and the bond markets evaluation of the private or public borrower. Average interest costs for debt have risen sharply for all companies. Rates are higher than average for some government enterprises and lower for others. SaskTel is the one government enterprise that seems to have access to very inexpensive debt. Bell has had favourable ratings in the bond market and has not issued new high interest rate debt as quickly as the western telephone companies. If we ignore Bell and SaskTel, the other government enterprises may have a one-half percentage point advantage on the smaller private firms. This may be an underestimate if the government enterprises' debt was evaluated at a lower rate than the smaller private firms without a guarantee from the Province. Evaluating this question is difficult because the major impact of the withdrawal of the government guarantee might be a sharp decline in the government enterprises debt-equity ratio. If there was no change in the debt to equity ratio then the one-half a percent is probably an underestimate. With a change in the debt to equity ratio,

---

[44]The data for BCTel in 1982 appears very high and it may be an error.

the cost impact would probably not be on the interest cost but would be through the higher relative cost of equity.

The debt costs of the private firms are relatively low because of regulation. That is the bond market knows that the regulators will permit cost increases to be passed through to consumers[45]. Consequently, the financial risk of default is low due to regulation for all the telecommunications companies.

The return to equity can be measured in a large number of practical ways. Since our concern is with the impact of actual costs on the prices faced by consumers we are using a realized rate of return on the book value of equity[46]. Panel C of Table 13 provides the evidence which can be contrasted with the debt rates in Panel B and the overall rates in panel A.

Due to the high debt to equity ratio at AGT, 'et' and MTS, small fluctuations in operating results lead to large fluctuations in the return on equity[47]. These fluctuations reduce the

---

[45]The interesting case in recent years is the disasters for regulated U.S. electric utilities associated with the construction of nuclear plants. It is important to see how the bond markets respond to the defaults in these cases.

[46]Remember that adjustments have been made in the Department of Communications source that we have used.

[47]SaskTel is the one government enterprise with a relatively low debt-equity ratio and the effects are not as large.

confidence that one can have in comparing the private and public firms over a few years. All of the government enterprises and particularly SaskTel, have high returns to equity in the years with relatively high net income. Overall the returns to equity in the government enterprises do not appear to be very low.

The evidence does not suggest that the returns to debt and equity have been a source of consistent cost advantage for the government enterprises relative to the private regulated phone companies. Two of the companies, AGT and MTS have slightly lower returns but the other two government enterprises do not.

Depreciation is an element in the cost of capital. Unfortunately, it is subject to considerable discretion by the companies. Figure One shows the average total cost of capital, after tax, returns to debt and equity and the depreciation rate.

The depreciation rate at AGT is very high relative to all other firms. These results can be used to illustrate a general problem arising from the accounting practices associated with depreciation. At the time that an investment is made, there is an expected useful lifetime of the asset which can be translated into a depreciation rate[48]. This rate is used in the cost of capital to determine if the investment is worth undertaking or if

---

[48]There are numerous translation methods between lifetimes and depreciation rates depending on the time profile of decay.

it is the least cost way of obtaining more services. If depreciation rates are increased, after an investment is in place, this is equivalent to a capital loss. Unfortunately, the usual accounting procedures will treat this as an expense on the income statement and not a loss. Almost all of the North American telephone companies have been increasing the depreciation rates[49] on a wide variety of equipment which they either have and/or expect to replace faster than initially anticipated. The problems with the accounting procedures arise from the failure to recognize unrealized capital losses. If the equipment was taken out of service before being fully depreciated this would be a capital loss. If depreciation can be speeded up, losses can be expensed. Over the actual lifetime of the equipment, it will be expensed at too low a rate in the early period, too high a rate during the latter period and too high over the whole period. Since depreciation is roughly thirty percent of operating expenses in this industry, this problem creates severe difficulties in judging performance. Regulatory agencies, for the private firms, have had a mixed effect on depreciation policies. In recent years, they have probably slowed the increase in the depreciation rates that the firms would have desired. Over a longer span, they have usually accepted the depreciation rates defined by the firms. There should be no inference that these are only problems for

---

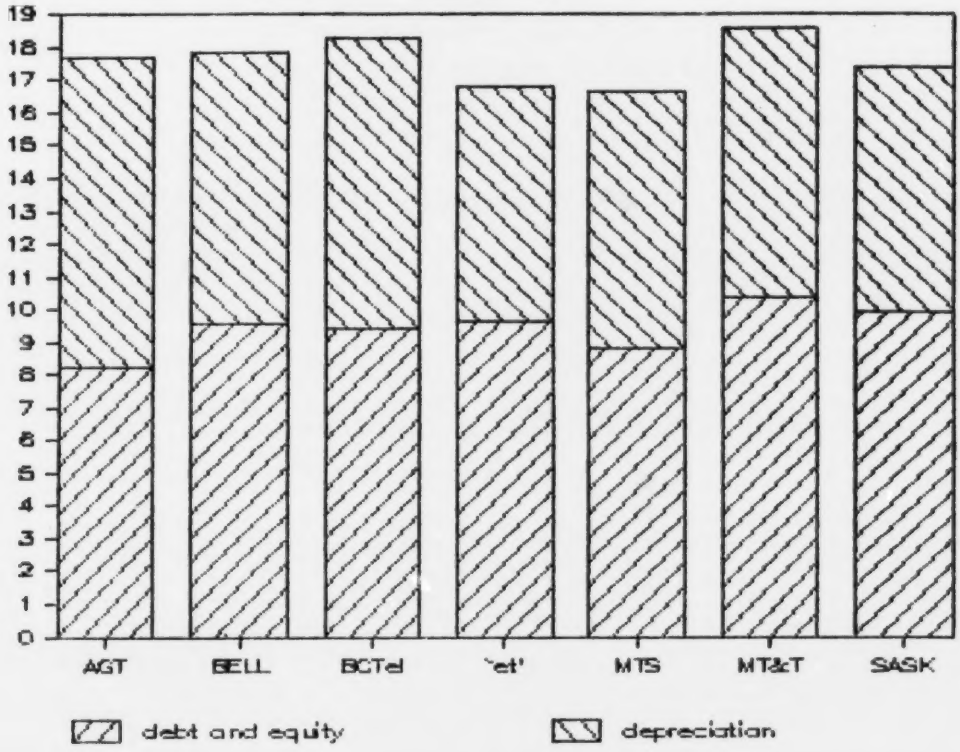
[49]The change in depreciation procedures to 'equal life groups' is similar to an increase in depreciation rates. This does not imply that the change was a mistake.

government enterprises or private regulated firms. They are general accounting problems. AGT's large depreciation expenses are just an example of this phenomenon.

In the telephone industry, in which the firms have traditionally been monopolies, some increases in depreciation rates are equivalent to self-imposed capital losses. That is, if the firm decides to speed up the introduction of new digital switches, this is equivalent to imposing a capital loss on itself. Depreciation rates on old switches are increased, which increases operating expenses in the short run. This is a capital loss disguised as an increase in expenses. It is difficulty for the firm's management to determine the optimal rate of introduction of new switches. For an outside observer, it is impossible to tell what motivated a particular rate of introduction of the new switches. If competition is absent then the firm has discretion in deciding when to update its technology. Phrases such as 'improved service' or 'offering the customer the latest technology' do not translate into a decision rule.

The total realized after tax cost of capital, Figure One, tends to be slightly higher for the private firms. Two firms, MTS and 'et' have a definitely lower total cost. There is merit to the argument that the public firms derive some cost advantages

Figure One: Total Cost of Capital



from both the lower cost of capital and the absence of any tax liabilities, discussed earlier.

6. EVALUATION AND CONTROL

6.1 Introduction

The general problems of evaluation and control were discussed in the theoretical section. In this part, the practical problems in the telephone companies will be investigated in more detail. The telephone companies all evolved into separate government enterprises after lengthy periods as departments or departmental agencies within the government. Perhaps, as a consequence, they are all closely allied with their governments and public knowledge of the evaluation and control procedures is quite limited. The size of the provincial governments is also a factor encouraging relatively close ties.

The firms are all operated by agents and I will begin with a brief comment on the agency issue. This will be followed by a discussion of the objectives of the firms. The next section will consider the increasing role of regulation as a control mechanism for the government enterprises.

6.2 Agents and Incentives

The managers of the telephone companies are all agents for the government. There has been extensive theoretical work on agency problems although much less empirical testing of these theories. One striking feature of the companies is the absence of any incentive pay for managers. Unlike the private sector in

which incentive schemes for managers are common, the government enterprises have eschewed this mechanism for motivating and controlling the management. This is probably a serious lapse on the part of the governments involved but it is also a symptom of a wider problem. Incentive systems for management can only be implemented if the government is willing to spell out objectives to which the management is supposed to strive. These objectives must be precise enough that bonuses can be awarded on some measured basis of results. The specification of objectives is our next topic.

6.3 Objectives

A detailed, specific set of objectives for the firm is seldom currently available for these companies[50]. In fact, the range of concern about its absence is quite different in the different companies. The continued close integration of the companies management with the government has made a public set of objectives less necessary. The nature of the industry is a second factor. Until very recently the provision of a voice network was the only major task. As a monopoly supplier, there were no problems from competitors and close substitutes were not available. The technological developments could be acquired from equipment suppliers and service contracts with larger operating

---

[50] The historical objectives for operating government owned telecommunications systems are discussed in the historical section of the report.

companies. In certain respects the production of telephone services can be compared to and contrasted with the provision of a water supply system which has been a government function for many years. Both require an extensive network which must be maintained and available at all times with a minimization of the probability of failure. The telephone network has become considerably more complex and the economic questions more perplexing than the water supply system as the range of services produced has increased. The increasing complexity has introduced more choices for management and complicated the planning task. This has required more attention to long run plans which will simultaneously update the existing network to an all digital system with increased use of high capacity multiplexed transmission systems. The emphasis on planning creates a need for guidelines or objectives against which plans can be measured.

Sask Tel produced a Basic Mission Statement in the mid 1970's. Although this is out of date in certain major aspects, that will be discussed, it is a useful example to illustrate what are the objectives and problems for all of these companies.

The basic organizing concept in the Sask Tel statement is called the 'utility concept'[51]. There are three components to this utility concept. First, as a monopoly, it has 'an

---

[51]The statement was published in a small unpaged document that we will refer to without any page numbers.

exclusive market franchise within the geographical area that it serves.' Second, it must serve all customers without discrimination and third 'it is accountable to the public with respect to the prices that it charges and the conditions of its service.'

This is a very broad delineation of the nature of the organization and its responsibilities. It does not provide an adequate statement of what objectives are important and how different objectives are to be weighed in an overall plan. Sask Tel, and the western telephone companies, are not unique in this attempt. Very few public or private non-profit organizations have a set of goals that are readily translated into measureable quantities. The qualitative characteristics that are captured in the utility concept emphasize the service nature of the operation and the public trust that has been thrust upon the organization to deliver service fairly and efficiently. Economists have always been very suspicious of this type of organization because of the lack of any precise definitions of objectives that could be monitored[52].

The service idea is expanded in a number of directions. The scope of the service and a service ideal are defined. The former

---

[52]The prevalence of this type of organization in society but outside the economy has implied that other social sciences have studied these types of organizations more extensively.

places limits on what Sask Tel will do and the latter provides some more specific criteria for public judgement. The ideal for telecommunications services[53] requires:

1) universal access,

2) privacy of communication,

3) immediate access and communication,

4) two-way service,

5) customer choice of message form,

6) customer choice of message content.

These provide areas in which the company chooses to be judged. Universal access is at the core of many of the recent disputes about the provision of telephone services and is a current political issue with strong links to the history of the government owned telephone systems. The ideal requires that some form of basic voice telephone service should be available to all residents. The pricing of basic residential telephone service has always reflected this goal. In practice, financial realities have always limited the possibilities. Moreover, the development of a rate structure based on the financial resources of the customer has been avoided. It is only very recently that special rates for a variety of needy groups has arisen. If universal access is important, then it must be distinguished from low residential rates for all customers independent of financial

---

[53]This service concept is very similar to the service concept that pre-divestiture AT&T used in the U.S. and that Bell Canada has also supported.

means. Politically, it is the ability to deliver low rates to all residential customers that is important. Neither politicians nor the companies desire the more direct subsidies and means tests that universal access may require in the future. The governments' dislike the current perceived threat to politically popular low residential rates[54].

Privacy of communication covers several ideas. First, the provision of single party service or secure[55] multi-party service has been an objective for many years. Second, the security of calls from listening that might arise from inside the phone company or externally can be included in this category.

The immediacy of access and communications has several components. Access depends predominantly on the customers choice of equipment relative to demand by others who might share the equipment. The company can only control the options available to the customers and not their choices. Immediate communications is part of the engineering standards of the network in the long run. This objective will illustrate an important point that applies to many other objectives. The value of instant

---

[54]The advent of competition is the primary threat but this is a consequence of technological developments that make competition unavoidable.

[55]This requires that other parties can not overhear an ongoing conversation on a multi-party line. These services are currently available.

communications is not known. Basically, the engineers set a tolerance level for failure and the company invests enough funds to acquire a network that will meet the tolerance standards. Since there is no competition, customers can not choose, at different prices, the probabilities of not being able to make a call. There can be considerable resources used in providing capacity to meet peak demands. It is one of the difficulties with sole suppliers that they do not tend to offer, at least on an experimental basis, the range of options that the market might desire. With the development of more intelligent electronic switches it should be possible to offer a wider variety of options and eliminate the past problems with this objective and many others[56].

Skipping the fourth item[57], the last two service aspects emphasize the fact that the company is a carrier that does not determine either the content of the message or the form of the message. The latter implies the breadth of types of carriage that the company will undertake. There are two underlying themes. First, the company as a carrier does not determine the content of what it carries and consequently does not have content

---

[56]The pressure for competition in the telephone equipment market was motivated by much the same concern as we have outlined here for instant communication.

[57]Two-way service is a key concept that has historically distinguished telecommunications from other types of communications.

regulation such as broadcasters undergo. Second there is no limit to the type of monopoly carriage service that the firm will undertake[58].

The Sask Tel service 'ideal' does help to outline the tasks of the firm. It leaves the operational content in practice unspecified but it was not intended as a rigid operational set of goals.

The following quote indicates the problems with the mission statement.

> "We will pursue our 'service ideal' and provide the services demanded within the bounds defined by our 'service scope'. We will endeavor to provide service in accordance with sound economic and business practices using the available capital, labour and technology to the best advantage within our socio-economic environment and any guidelines applicable from time to time, including:
>
> a) The common carrier duty to offer the monopoly type or basic telecommunications services to everyone within our franchise area without unreasonable discrimination. In so doing, we will avoid treatment of a subscriber which is harsher than that accorded others receiving similar service or faced with a similar situation and will refrain from meeting the requests of individuals or groups for preferential treatment.
>
> b) The application of system concepts and rating principles that are basic to universal access.
>
> c) The directives and guidelines of government.
>
> d) The competitive environment."

---

[58] Examples are voice, facsimile and data.

There is very little in this quote that allows one to assess how conflicting objectives are to be balanced by the firm. This is particularly difficult because the financial purposes are not properly integrated with the broader purposes.

The broad financial objective was to produce enough revenue to pay for long run costs, including capital. This objective was taken seriously[59] within the constraints of limited equity investment and guaranteed government debt. It was recognized that the financial goals would place limitations on the level and structure of prices. However, it was clear that prices for basic services were to be kept low through averaging across the system for the same service and by subsidies across services.

Prices were to be set to encourage residents to subscribe while simultaneously distributing costs equitably and encouraging efficiency. Rates were to be easy to administer and understand and the rate structure would offer the options that customers desired. There was, of course, no method for achieving these ends or weighing the trade-offs but this is not unusual.

The existence of competitive services were recognized. The company was pledged to attempt to maximize the profits from

---

[59]This is true since the Second World War although it does not apply to the pre-war period.

these services and to price them to ensure that all of the costs of providing competitive services fell on the user and were not born by the basic telephone service customers. The second criteria could easily be encompassed in the first. There were two ambiguous statements about competitive services which conflict with the first two and reflect the difficulties of defining the objectives of competitive services with the service framework. While describing the 'Competitive Business Mission', the document states, "We will achieve and/or maintain a dominant position in the telecommunications market" and "We will pursue the Service Ideal as our ultimate aim". Neither of these is consistent with maximizing profits in many cases.

While there were other 'missions' associated with personnel and public relations, they are not as important for our purposes. The Sask Tel Mission statement provides an approximate, but appropriate, outline for any of the telephone companies. It was mentioned that the statement has some dated features. The increased state of actual and incipient competition in the 1980's has resulted in a need to redefine the objectives of these companies. The companies are going to lose their historic role as sole supplier of telephone services. To varying degrees this has already occurred in the equipment market. Customers can select among many suppliers. The utility concept itself may be under serious challenge. Supporting the core of this concept is the idea that there is one network that will have prices that are

weakly and inconsistently linked to costs. There is unlikely to be one network in the future although it is the linkage of networks that is important. The old network was consistent because it provided voice services almost exclusively. Even in this case the quality of transmission, required for automatic switching equipment, led to the upgrading of rural lines. This upgrading was not required for the customer but rather for the company to integrate the network[60]. The new network will certainly be digital. The question of who pays for the digital network and why will arise. Will it be necessary to impose costs on voice only traffic to pay for other types of transmissions or vice versa? More fundamentally, can these cost allocations be made? This can be rephrased to ask what are the costs of maintaining relatively complete integration of the network and who will pay for them? The answer may be no one.

The details of objectives in the short-run and in more operational form are not made public. The regulation that most of these companies undergo provides the only forum for public consideration of their activity. I will now consider control by regulation.

---

[60]There were benefits for the customer. The problem is that the customer never had the proper choice of paying or not paying for these benfits at levls that covered their costs.

6.4 Regulation

In the last twenty-five years, there has been a movement towards the use of regulatory agencies to control the government enterprises in telecommunications[61]. It is reasonable to wonder why these agencies are needed. They do not provide any control mechanisms that were not available to the government prior to their introduction.

They have arisen as a means of providing the public with a forum to scrutinize the activities of the enterprise. The governments have supported the creation of these forums because they were unwilling and unable to find an alternative means of avoiding public criticism of government enterprise policies. That is, the governments found it politically astute to set up an independent agency to review and approve the policies, and especially the politically sensitive rates of public enterprises. By doing this, the government could shift the burden of responsibility for telephone rates to the regulatory agency and gain some legitimacy for the required rate changes[62]. The public would have a means of assessing the pricing and other policies

---

[61] A similar process can be seen in publicly-owned electric utilities.

[62] Recall that local rates had not changed sharply, or sometimes at all, for up to forty years.

of the firm. The regulatory agency would have to find a means for establishing pricing structures and price changes that were acceptable.

The government support for the regulatory agencies suggests several comments. First, government enterprises in telecommunications are selling a services that are highly visible to most voters, since they are also subscribers. If these enterprises were to be commercially viable, i.e. not a drain on the public treasury, rates had to be adjusted periodically in response to changing business conditions. The governments did not wish to defend these changes in the political arena. Rather they wanted a mechanism that would limit the political liabilities of changing telephone rates. Second, the governments must have felt that they did not have objectives for these enterprises that would conflict with the regulatory process. There was a balancing of interests by the government. The benefits, to the government, of the regulatory procedures outweighed the possible loss of capabilities engendered by turning over power to the regulatory agency.

We will use the recent Alberta Government Telephones' case to illustrate the type of regulatory control that the governments have been willing to accept. This will be followed by an analysis of the situation in Manitoba. The key elements are the political

benefits perceived to flow from the regulatory control of telephone rates.

6.4.1 The 1983-84 Alberta Government Telephones Rate Case

This case began with AGT's request, in February 1983, for a hearing to decide on new rates and ended with a judgement issued by the Public Utilities Board of Alberta in June of 1984. It is an interesting case because of the context in which AGT was making the application and it illustrates the nature of the regulation that is being applied in all the Provincial companies.

AGT had experienced enormously rapid growth in revenues in the seventies. The energy crisis elsewhere was the energy boom for Alberta. The growth in population and telephone services was very rapid and provided money for the rapid expansion and upgrading of the telephone system. The company had already participated in the benefits of the rapid toll expansion that began in the sixties. The eighties brought a very rapid halt to this growth and introduced the possibilities of new competition. The 1983 AGT application was motivated by the rapid deterioration in its financial situation and a desire to begin the long road towards cost based rates[63]. The Public Utility Board's decision

---

[63]The North American telephone industry, and the government enterprises are not an exception have attempted to justify a value of service concept of rates. There is no adequate explanation of this rate basis.

was delayed by the continued rapid changes in AGT's financial position during 1983 as the case proceeded and the requirement that forecast results for 1983 be used to justify revenue requirements.

Since the government can control the firm without the regulatory agency, the interesting questions relate to the role of the regulatory agency in controlling an enterprise that is already under government control. In general, what is noteworthy is the similarity of the regulation of government enterprises compared to private telecommunications enterprises. It is almost as if the government was not the owner or that the ownership made little difference. In the Board discussions and decisions there are references to decisions by regulatory boards in other jurisdictions dealing with private firms and very little original regulation. Most issues that are contentious are those that arise in other boards and they are not handled particularly differently in Alberta than elsewhere.

The government established the nature of the regulation of AGT and other public utilities in the Public Utilities Board Act. The Act requires that all rates must be approved by the Public Utilities Board and that the revenue of the enterprise must be sufficient to cover its long run costs. A rate base form of regulation was specified. The possibilities for some new creative forms of regulation were largely eliminated by the Act

and the history of Alberta regulation is similar to most other regulatory jurisdictions.

Traditional rate of return regulation has many variants in detail but the defects are common to almost all of the forms[64]. First, a rate base is established. This is a measure in historical dollars, i.e original cost, of the investment in equipment, buildings, structures and working capital on which the company is going to earn a return. Alternatively, the rate base may be measured as the total capital on the liability side of the balance sheet. Second, a rate of return has to be approved. This is based on the embedded cost of debt and the return to equity weighted by their respective shares in total capital.

In the AGT case, there was relatively little controversy about the rate of return itself because of the high debt-equity ratio. Some concern was expressed about the foreign exchange rate used to calculate the value of the foreign denominated debt and some short-term notes were removed from the calculation of the debt. Since AGT does not have any significant equity, the rate of return on equity was set at fifteen percent without any controversy. There was no criteria established for how to set

---

[64] I believe that too much faith has been placed in rate of return regulation but it may be difficult to establish a clearly superior general procedure.

this rate for a government enterprises but there is little material importance to this rate for AGT.

The rate base generated a little controversy although most of the serious issues are not considered by any of the regulatory boards. The rate base changes due to the construction program combined with the depreciation of existing equipment and the entry and exit of equipment from service. Intervenors attempted to dispute the size of the construction program and AGT's speed of adjustment of this program to the declining Alberta economy. The intervenors were not successful. Regulatory agencies have been hesitant to criticize or disallow the construction program determined by management. Almost no one disputes the principle that the management must manage the company and that the Board can not usurp the management. The line that must be drawn between what is managements' perogative and what is the Board's is determined by the Board. Most Boards, including Alberta's, have been very conservative in interpretation of their own rights. Unfortunately, this implies that control over the regulated companies tends to be superficial.

The problems of depreciation rates are discussed in the part of section 5 on depreciation expenses. There, we also noted the very high depreciation rates of AGT. These relatively high rates were not discussed at the hearing. This was due to

the acceptance of the methods used by the management to determine these rates[65].

The key implicit premise in most forms of rate of return regulation is that there are no risks and consequently no capital gains or losses. Investments are all to earn a return based on their initial costs. This does not provide the correct incentive structure for management and it makes it impossible for the regulator or intervenor to judge the appropriateness of the construction program or the rate at which old equipment is scrapped. Boards have accepted the managements' perogative to manage without finding a method of judging the adequacy of the management.

The Board is supposed to judge the adequacy of expenditures by the company but it has very little capability of judging these expenditures. This is one of the persistent difficulties of any supervisory body. It is informative to compare the roles and capabilities of regulatory boards and boards of directors in this regard. The board of directors of a private firm can not enter into the detailed expenditure of the firm. It does not have the information and if it was obtained there would be problems of interpreting that information and judging its veracity. The Board can concentrate on the long run goal of making profits and participating in the planning for major

---

[65]There was some initial disagreement over depreciation with an intervenor but this was settled.

long-run decisions. The board of directors of a government enterprise have the same problems and possibilities but they may lack a clear set of goals to assist them in making long-run decisions and in judging the performance of the management. The regulatory board must contend with the same difficulties but with a very different set of constraints.

The regulatory boards' hearings are often open and are subject to a set of legal and procedural rules that do not hamper the other two boards. Informal interchanges are limited. The board has a set of objectives, as specified by the relevant acts. These objectives are limited to ensuring that rates are just and non-discriminatory and permit the firm to earn its rate of return[66]. Most boards have interpreted their role in sufficiently restrained fashion that they have not actively pursued these goals except within very narrow limits. The major self-imposed constraint has been based on the right of management to manage which has been generously interpreted.

The failure of regulatory boards to set a criteria to judge construction programs and depreciation rates leaves the size of the capital and a major portion of expenses outside of the boards control. Yet it is hard to imagine a set of just prices

---

[66]These objectives are consistent with the firm's objectives as stated, for example, in the Sask Tel Basic Mission Statement.

and efficient production which does not require concern for these items.

To determine the rates permitted AGT must provide forecasts of the services it expects to sell and the expenses of associated with providing these services. The forecast revenues, at existing rates, and expenses will allow the calculation of an expected rate of return on the expected capital. Rates can then be adjusted such that, at the new set of rates, the expected rate of return equals the allowed rate of return. The process is complicated in its details.

If all rates are changed proportionately, there is little difficulty in obtaining new rates that permit the company to earn its allowed rate of return. In the last decade, changes in relative prices have been sought by most telephone companies and AGT was not an exception. First, AGT belongs to Telecom Canada which controls the rates for inter-provincial calls[67]. These rates have not been actively regulated and AGT could not generate extra revenue from rate increases for this service. Second, AGT had presented evidence purporting to show that toll rates were above costs and exchange rates below costs. The management wanted to move the exchange rates towards costs. Consequently,

---

[67]Alberta, unlike most other provinces does not use Telcomm Canada rastes for adjacent toll service. There are separate agreements with BC and Saskatchewan.

almost all of the increases would be on non-toll services. The Alberta Public Utilities Board approved the relative price shifts sought by AGT.

There has never been any well defined method to judge a particular set of rates relative to the regulatory objectives. Regulatory boards have usually accepted company changes in rates although opposition has stiffened in recent years. The move to increase exchange rates relative to other rates is seen as a political liability and contrary to most boards' mandate to keep the price of basic phone service low. While companies have used the ill-defined concept of value of service to defend discriminatory prices in the past, the key element has been the refusal of most boards to enter deeply into the determination of the rate structure. The latter remains as a management perogative.

Since AGT has competitive services, rates in these areas are not subject to the same control as those in the non-competitive services. The company's policy for these rates is quoted (p.239),

> "AGT's policy with respect to Non-Basic Service is to continually maintain the rates at market levels which will generate a positive contribution to Basic Services."

In fact, a floor price is calculated to establish the minimum price at which AGT will sell a service. This price is based on a calculation of the present value of incremental cash flows for individual services. The purpose is to ensure that basic,

non-competitive, services do not subsidize the competitive services. To avoid disclosure of competitive information the details of the calculations for individual services are not released. An aggregate for all non-basic services is available. One of the intervenors attempted to establish that the contribution of the aggregate non-basic services originated predominantly from the directory. The latter is a competitive service and has traditionally been profitable for most telephone companies. The intervention was unsuccessful. Fundamentally, the Board was unwilling to intervene into the profitability of individual services.

There are serious problems in designing a contribution test particularly if it is aggregated. The telephone system is permeated with common costs which can not be allocated and the use of incremental costs is potentially misleading. For the government enterprises, the problems of forecasting cash flows are increased by questions of the discount factor that is used.

6.4.2 The Structure of Accountability and Control in Manitoba.

The current structure of MTS was set out in the Manitoba Telephone Act initially passed in 1955 and amended at various times after that date.

The government through the Lieutenant Governor in Council appoints a Board of Commissioners. The size of the Board may vary from four to nine and recently there have been seven members. The government appoints a chairman and a vice-chairman. The length of appointments can vary. One member of the Board is usually a member of the Provincial Legislature. The Board basically functions as a Board of Directors of a private firm but is, of course, limited by its dependence on the government.

The Board reports to the Minister of Public Utilities who isresponsible for the Manitoba Telephone Act and through the Minister to the Legislature. An annual report must be submitted to the Legislature and is referred to The Standing Committee on Public Utilities and Natural Resources.

The System has a General Manager as chief executive officer and he is appointed by the government. The Board members work only part-time on MTS business and the General Manger has an Executive Committee who assist him in the full-time operations of MTS.

Rates have to be approved by the Public Utilities Board. The PUB has to consider,

> "a) the amount required to provide sufficient moneys to cover operating, maintenance and administrative expense;
>
> b) interest and expenses on debt incurred for the purposes of the commission by the government;
>
> c) interest on debts incurred by the commission;
>
> d) reserves for replacement, renewal, and obsolesence, or works of the commission;
>
> e) such other reserves as are necessary for the maintenance, operation, and replacement or works of the commission;
>
> f) and such other payments as are required to be made out of revenue:"[68]

Although the purposes of the Commission are not completely spelled out in the Act, the PUB has not had many chances to review the decisions of MTS. There were relatively few rate cases until the mid-seventies which lessened any influence that the PUB had over MTS.

The role of the PUB in controlling MTS can be demonstrated by considering two recent rate cases in some detail. Before discussing these cases some observations about the earlier rate hearings will be helpful.

The PUB did not hear a rate case between 1921 and 1955. Rates were either unchanged or a few declined as the System

---

[68]The Manitoba Telephone Act, 1983, 39(2).

attempted to maintain customers during the depression. This does not imply that the PUB had limited power. The PUB has substantial investigative power and can authorize changes in the practices of public utilities in Manitoba. For example, the PUB may "investigate upon its own initiative, upon request of the minister or Lieutenant Governor in Council, or upon written public complaint, any matter concerning any public utility"[69]. It may also "fix just and reasonable individual rates, joint rates" and "fix just and reasonable standards,... practices, measurements or service"[70]

The PUB has not exercised these powers but they do exist. The PUB would argue that it has been satisfied with the companies decisions although in most cases, there has been no detailed investigation on which to base this judgement. The rate hearing in 1955 basically permitted the company to catch up with the inflation that occurred in the post-war period without entering into the details of management practices with regard to either rates or expenditures. There was no attempt at developing a rate of return methodology to assist in the determination of rates. It was strictly a matter of ensuring that the revenues were sufficient to cover costs.

---

[69] Public Utilities Board Act, 1970, 280

[70] ibid

MTS did not return to the PUB until 1975. By this time, financial problems were again evident and the PUB had to respond to the obvious financial needs of the company. The PUB did discuss and criticize some of the practices of the MTS. Managements' perogatives remained largely intact. The PUB wished to restrain MTS from expenditures that would entail further rate increases. It did not suggest how the management should decide on new initiatives.

The rate cases in 1982 and 1983 involved a much more active role for the PUB relative to the earlier cases and reflected the increasing difficulties of isolating MTS from competition and events in other jurisdictions. The Board accepted MTS's position that the company was again headed towards a deficit in the short-run. MTS wanted sufficient revenue to be provided to prevent losses and to allow the debt ratio to be reduced at a rate of 1% a year. The debt ratio was at 84% and MTS wished to reduce it substantially over time.

The PUB did not fully accept the arguments for rate increases based on investments that would improve the system and was not interested in rate increases that would be used to reduce the debt ratio. The PUB questioned the necessity to cover foreign exchange losses, which had been large, through rate increases. Increases in the debt of the PUB was preferred in order to delay the impact.

In 1982, the Government of Manitoba authorized the attachment of non-MTS owned residential extension phones. This was done as direct government policy. MTS revenues were effected because rates on premium and extension equipment had been used to subsidize the basic service rates. The annual cost in lost revenue to the system was $1.7 million dollars.

The PUB allowed residential service rates to increase by 10% but this was less than the 16% increase requested by the company.[71] Similarily the PUB restricted the increases on many business services. The PUB was resticting the size of the rate increases for basic services although it did not oppose the continuing shift of many relative rates to reflect costs.

Construction programs are always a potentially contentious issue with regulators. In telecommunications there is always a substantial amount of up-grading in the investment program. Regulators are never certain how to handle this problem and the PUB issued another warning to MTS wo be careful. The PUB failed to actually specify what it expected MTS to do with the construction program.

MTS confronts problems with the changing methodology associated with the Telecom Canada division of the long distance

---

[71]The requested rate increase was to cover increased costs other than the new extension policy.

inter-company toll revenue. MTS has lived very comfortably from these toll revenues and the threats to this income were recognized by the PUB. Approximately have of MTS's revenue comes from this source and the PUB tried to provide support in defending this revenue. For the PUB, the decline in Telecom revenue will require rate increases for basic services. The latter are highly subsidized at the moment.

The 1983 rate case was inevitable given the restrictions on the 1982 rate increases and the continuing poor economic climate. The PUB granted most of the increases although there were several interesting aspects. First, the PUB continued to prevent any attempts to shift relative rates against the rural areas. For example, MTS had proposed increases in basic rates in equal dollar rather than equal percentage terms. The PUB did not permit this because the percentage increase for smaller exchanges would have been larger than for bigger ones. The continued use of common percentage increases the dollar spread between large and small exchange groups.

Second, the PUB continued its opposition to fancy construction programs and any attempts to use rate increases to alter the debt equity ratio.

Third, MTS described, in general, their attempts to balance four factors in arriving at rates. These factors are costs of

service, value of service, Province-wide price averaging and contribution revenue. Telephone companies have been distinctly unwilling to discuss how prices are determined. The recent willingness to reveal the process is in reponse to the changed circumstances that has forced all companies to seek rates that are based on costs. For example, service charges were increased by thirty percent and they were still estimated to cover only one-half of actual costs. This increase should be contrasted with the six percent increase in most basic rates. Public phone charges were increased by one hundred and fifty percent. In recent years the phone companies have been acquiring more revenue through the increase in rates for services that were formerly very under-priced or not priced at all. These relatively easy sources of new revenue are being exhausted and tougher political choices will have to be made in the future.

These cases illustrate some important aspects of the control of the government telephone system in Manitoba. First, the government does not need either a PUB or a Commission to control MTS. The government has chosen to create these institutions in order to permit the government-owned telephone system to be separated form the normal political and legislative process. Over time, the government has found it useful to increase this separation of government from the company. The case of non-MTS residential phones is unusual. MTS did not make the decision or even announce the decision. Perceiving the political value of

the announcement, the government directly changed one aspect of MTS's monopoly powers. There is no doubt that the government informed MTS of the impending change and MTS probably opposed the move. The government left the resolution of how to absorb the effects of the change to MTS and the PUB. Thus the government derived political credit for reducing prices and introducing consumer choice, without having to resolve the financial issues involved. The PUB partially blocked the attempt by MTS to recover the funds through residential rate increases although ultimately this is where the funds will be found.

In the rate cases, the PUB has not moved to include a rate of return determination for revenue requirements. This is the major type of North American utility rate regulation. Alberta does use a rate of return criteria for AGT. For government enterprises, the use of a rate of return requires some amendments relative to the normal practice in regulating private monopolies. If these amendments are not made then rate of return regulation is not necessary. In Manitoba, the government appears not to wish to establish a formal rate of return procedure for evaluating the money invested in MTS. Consequently, the amount of net income after debt payments is kept fairly low in order to prevent rate increases. The cost of the subsidization of rates to the Manitoba tax payer is difficult to assess. It would be preferable if the costs of social policies concerning telephone rates could be more directly evaluated.

The evolution of regulation of the government enterprises has been slower in Manitoba than Alberta but in both jurisdictions the government has found it helpful to provide a visible means of providing public discussions of the rate changes. Alberta has gone beyond Manitoba because it has investigated more details of the expenditure side. In this sense, its procedures more closely match those at the CRTC.

In Manitoba there are other mechanisms used to control MTS. The company is audited by outside auditors, it has its own internal audit committee and the Commissioners have an audit committee. Moreover, the public auditor of Manitoba has access to the companies records. The mechanisms are in place to ensure accountability although it must be remembered that the governments' will to use these mechanisms must exist. The government controls the appointments of all the actors and ultimately must take responsibility for the outcomes.

The borrowing powers of MTS are limited. Aside from limited short-run borrowing, MTS must gain some type of approval, the exact conditions vary, before undertaking any type of long-run financing. MTS's long-term debt is divided between Advances from the Provincial Government, approximately one-third of the total, and Bonds which are fully guaranteed by the Government. Approval of the Minister of Finance was required for both types of debt. The Minister of Finance holds trust accounts for investment and

sinking funds associated with the two major classes of long-term debt.

There is no explicit policy about what has to be done with retained earnings. However, the existence of the borrowing constraints combined with the direct involvement of the government through its appointment powers in the management of the company probably ensures that such a policy is not required. The level of rates in Manitoba are sufficiently low relative to expenses that retained earnings are relatively small. They have recently been less than five percent of revenue and less than two percent of the assets. They can not provide even five percent of the uses of funds. Implicitly, they have simply been a means for financing a small portion of the construction program and other uses of funds.

We will not provide the same details for SaskTel and 'et'. SaskTel has been discussed in some detail in Waverman (1983) and 'et' does not have as much public control structure that can be discussed.

The Federal government has been deeply concerned about the accountability of government enterprises during the last decade. The procedures in the telephone companies can be compared to some of the proposals and criticisms offered at the federal level. The Report of the Auditor General has repeatedly called for new

controls and accountability for Crown Corporations. In many aspects the concerns have mirrored those of the earlier Lambert and Glassco Commissions.

All investigators have been distressed about the failure to clearly define the objectives. The vagueness has extended to the scope and sometimes authority of the government enterprises. Moreover the failure to attempt to separate commercial and non-commercial objectives is perceived to be a major problem in evaluating and controlling these firms. I have argued earlier in this report both why I agree with the need for clarification and also why I do not believe that this request will realistically be satisfied. It is not in the interest of the politicians in power to provide clarity unless the political rewards are very direct. In most cases of government enterprises, this is not true.

The Auditor General has consistently argued for the elimination of equity investment in government enterprises. His fear is that equity investments do not properly enter into an overall picture of the financial health of the parent government. Often these equity investments are used to hide uncollectable loans by converting them to equity[72]. This proposal is incorrect. There may be a need to redesign the government

---

[72]In the 1979 report, the Auditor General used the example of the conversion into equity of loans to the St Lawrence Seaway Authority.

financial accounts to properly reflect equity in government enterprises. However, the elimination of equity is not a sensible method. Some equity is needed to permit the enterprise to operate independently and even in the long-run a debt equity split may be useful. It is not clear what is the appropriate debt-equity ratio or the costs of equity compared to debt. These are the imporant questions in regard to equity.

In amny cases, the recommendations from outside observers, have stressed the accountability to Parliament. There is an important issue about the role of Parliament compared to the Government. We have not dealt extensively with this political issue. Problems of lack of accountability to Parliament are a special case of accountability. Many government enterprises, including the telephone companies have enough structure in place to be accountable to the government. This does not imply that the government wishes them to be accountable to Parliament in a manner that might be politically embarassing to the government.

7. THE FUTURE OF GOVERNMENT ENTERPRISES IN TELECOMMUNICATIONS

Government enterprises in Canadian[73] telecommunications are entering a difficult, perhaps fatal, period in their history. Telecommunications, unlike electricity, is coming to the end of the period in which it was a stable utility, providing a basic service to almost all the population. The rapid innovations in telecommunications and the closely related computer field are leading to sharp shifts in the commercial possibilities for the industry. There are several broad possibilities for the long-run future of the industry. It may become a competitive industry with little or no regulation and government enterprises. At the other extreme, a new monopoly may form, based on costs and the available technology and this will require regulation and/or government ownership. In between are a bewildering range of possibilities which will be observed in the short and medium run until some of the characteristics of the new industry become clearer. The continuation of the heavy government involvement in the existing industry will slow down the adjustment to either long-run outcome. If government enterprises are to survive a new role must be found for them which conforms with the recent advances in the technological possibilities.

---

[73]The same phenomena is occurring elsewhere. Both the Japanese and the British are dismantling their government telecommunications firms.

The government enterprises in western Canada have been monopolies in most telecommunications' spheres[74] until very recently. Under this monopoly, they have benefitted from the very large surpluses generated from long distance or toll traffic. The introduction of new equipment and services have been under their control which has eliminated many financial risks. These advantages are or will be lost. Competition has begun in both the equipment and long distance markets in Canada. The degree of competition varies widely from company to company but it is gradually spreading. Although there is active opposition to the transformation of this industry, it is my opinion that the support for the change is too large for the current structure to be maintained.

With the advent of competition, the telecommunications industry, defined by its current range of services, will not be a monopoly and the need for government ownership and regulation will have to be re-assessed. What purposes will government enterprises serve in a competitive market?

The Canadian telecommunications' price structure under both the government's ownership and the regulation of public and private firms has been severely distorted relative to costs. At the pre-competitive prices, there were and are profits

---

[74]There are small areas in which competition has existed in some jurisdictions for many years. They have not constituted a major share of the revenue.

available in a number of new and existing services and equipment. These profits are a function of the existing price structure. The future structure of the industry, after competition has eliminated the current distorted price structure, is unknown. Whether a competitive industry is feasible in the long run and exactly how competitive it will be is unknown[75]. The powerful short-run incentives offered by the current price structure should not be underestimated. There is a mistaken tendency to perceive the successful current entry into telecommunications as the a signal that many firms can survive in the industry at prices that are lower than current prices. This may be true but good evidence is not yet available.

The responsible governments, at all levels, are the most important actors in the future developments in telecommunications and they have been very slow at clearly enunciating forward-looking policies or even formulations of the tough questions. This is partially because the questions and their possible answers are politically risky and partially because the governments have never known what the effects of their past policies have been[76]. Some tough policy choices must be considered.

---

[75]The range of services which are competitive and there cost complementarity with monopoly services is crucial.

[76]The governments have not been aided by most telecommunications industry. The latter have tried, in most cases, to shield themselves from government enquiries.

The form and/or continued existence of a basic voice network, which is possibly subsidized, is the most basic issue confronting policy makers. If the goal is to ensure that most households are connected to a network, the means of achieving this goal and for what type of network have not been settled. If minimal telephone service is considered, in the future, to be a public utility, like water, sewage and electricity, then it is a simple voice network that might be provided to everyone. This network will not support all of the various enhanced services and there will be questions about the possibilities of integrating this basic type of network with other networks. That is, how compatible must different networks be and who pays any costs of achieving and maintaining compatibility?

There are two problems which will require hard choices. The first is the nature of the basic network. The second is the pricing structure, including subsidies, required to achieve a high proportion of subscribers among all households[77]. The first has not been extensively debated while the second has certainly be the focus of many discussions.

The first <u>has not</u> been discussed directly for at least two reasons. There has been some evidence, and perhaps an

---

[77]We will ignore the question of how high the proportion must be. It is an important question. We will assume that high implies at least 95 percent of households.

implicit assumption, that the complete network can be upgraded as new innovations occur. There has also been the development of specialized networks as components within the total network. It is unclear that any social economic optimization has been undertaken when these choices were made. Second, there has been an implicit discussion of this question buried in the debate about cost allocations. It is cost allocation problems that make any choice about the networks difficult.

Opposition to the new competitive telecommunications industry has been partially based on the politically relevant issue of universal access. That is the opposition has tried to use the fear that the new industry will set prices for basic local services at a level that will significantly reduce the proportion of households that are subscribers. Linked to this point of view, although it is a separate issue, is the political fear that increasing local telephone rates is a sensitive issue with voters. While there has never been much explanation for subsidizing all subscribers to local residential services, voters may still resist the increase in price[78].

If the existing price for local residential services is below costs and prices are raised to cover costs, there are two separate problems. First, how many households will actually

---

[78]The possibility of removing the baby bonus for middle class Canadians is an example of this phenomena.

disconnect? Second, given some loss of subscribers, what is the appropriate policy in regard to both the subscribers who disconnect and those that remain connected but who object to the extra cost that has been imposed on them?

There is little accurate information about the number of subscribers who would disconnect or new households who would not connect, at any higher price level. Given some decline in the proportion of households that subscribe due to an increase in rates, a policy would have to be formulated.

One component of the policy should be to convince those subscribers who remain connected that they should be expected to pay the cost of the services they use. Politicians fear that the voters will not readily accept this change but it is required if rates are going to be related to costs. Given that subsidies to most residential subscribers are removed, a policy that attempts to extend service to some non-subscribers will be much less expensive. The policy will require a means test or other criteria to prevent abuse of any subsidies. This policy is a second-best one. There is no particular reason for subsidizing telephone services rather than other commodities for low income households. It would be preferable to improve the policies that deal directly with income supplements to low income households. This is politically unlikely, which implies that a new telephone subsidy will be required or at least attempted.

Subsidies in the past have been paid for by the industry itself through cross-subsidies from one service or group of subscribers to other services and subscribers. This has been the source of many of the current serious problems in the industry. For example, the distorted relative prices that invite entry are due to this past policy. As competition spreads it will not be possible to generate the revenue for subsidies from within the industry[79]. Even if it were feasible, as a matter of policy, it should not be done.

The most likely outcome is the growth of special rates for targeted groups[80] which guarantees minimal service. These should be paid for from general tax revenue and not from telephone revenues.

There are two key components of the government's policy in support of the future competitive telecommunications industry. First is a willingness to let prices adjust with competition without lengthy and involved government interference[81]. Second

---

[79]The current U.S. situation illustates the difficulties of maintaining internally funded subsidies and the resistance of governments to switching to tax-based subsidies.

[80]These are sometimes called 'life-line' rates which would be available to those participating in other social welfare programs or who satisfy some easily identifiable criteria.

[81]The U.S. governments are still too entangled in the deregulation of telecommunications in the U.S.

is the necessity for the government to sort out the particular subsidies that they wish to maintain. General tax revenues should be used to pay for any remaining subsidies.

All Canadian telecommunications firms initially opposed the attempts to introduce competition into the industry. However, the equipment market has been opened, in part or whole, to competition in many provinces of Canada. Certainly, there is no valid argument for insisting that the equipment on the customer premises be owned by the telephone company.
The toll market is not yet open to competition, although CNCP telecommunications can compete for certain non-message toll services and is seeking further interconnection with the local loops of the telephone companies across Canada.

As the Canadian telephone companies have perceived the inevitability of increased competition they have changed their position. More companies are willing to accept some competition and to work out the details of the transition to a more competitive industry. As an example, the government enterprises in the West, opposed vigorously the initial CNCP application to provide competitive services. The companies have not organized a concerted effort to simply oppose the latest CNCP proposals, although they are certainly interested in the outcome and would not be classified as supporters of the effort.

Is there a role left for a government enterprise in a competitive environment? Historically, the goals were to provide telephone service to the whole population at a reasonable price and to avoid the potential problems with a private monopoly. Since basic telephone service is widely spread throughout these provinces and regulation has controlled the worst excesses of private monopolies, the historical goals have been largely met. Basic residential telephone service is very inexpensive for the subscribers of the government enterprises,at the moment. The advent of competition will force up the basic service rates. What other goals might support the maintenance of a government enterprise?

In the short run, the local loop[82] will remain a monopoly. This will provide a justification for the existence of the government enterprises as suppliers of the local loop. This monopoly would probably be extended to the provision of local voice and perhaps non-voice telephone services. The company would only have a monopoly over the transmission segment of the service.

The government enterprises are already providing competitive services. This segment of their business will likely expand.

---

[82]The local loop is the connection between the subscribers premises and the central office. The latter is the first switch that traffic must pass through. There are serious threats to this monopoly in the longer run.

What justification exists for government enterprise in competitive businesses? What problems exist if these enterprises do provide competitive services?

In the short-run, there has been no detailed justification in principle for the participation of government enterprises in competitive businesses. A combination of practical judgement and inertia have resulted in their involvement. The companies have not wanted to withdraw from segments of their historical markets simply because they faced competition. The government owners have not taken a stand on the general role of competitive activities.

The companies have tried to remain as competitive suppliers in their former markets or those closely related. Since they are established in these markets they have the human and physical capital to compete. Whether they are efficient enough to compete is not yet determined in most markets. The existence of competitive and non-competitive business within the same firm creates serious problems[83]. The network involves many joint costs which can not be allocated. Attempts have been made to ensure that business in the competitive markets is not subsidized by the non-competitive services. However, this is practically impossible to do if there are common costs. The current

---

[83]These problems were the direct cause of the AT&T divestiture in the U.S. The problems in the U.S. remain and they are only just beginning in Canada.

procedures are not adequate since they are based on incremental costs and do not monitor individual services. If the government enterprises sell an increasing proportion of their services in competitive markets over longer periods of time, an improved solution will have to be found. If it is not found, the U.S. experience suggests that there will be increasing conflict over the role of competitive vs non-competitive services.

There has been limited resistance to the government enterprises remaining in competitive markets partially because the new private entrants into the former monopoly markets have not had a consistent notion of what government enterprises should be permitted to do. These private companies want access to the markets. In practice, they realize that they can not drive out the telephone companies initially but they are concerned that the telephone companies do not compete un
fairly. As discussed above, this is very difficult to ensure.

The possibilities for new expanded services in telecommunications and in the interface with the computer industry are large. How extensively to introduce new services that will conflict with existing private firms or prevent their creation is a problem to which the government enterprises are sensitive.

Government enterprises will not rapidly disappear from Canadian telecommunications. The provinces and municipality that own firms do not wish to see control shifted out of their

hands to either the Federal government or a large national or international private firm. The future is still very uncertain. A new more limited role must be defined once the competitive forces are more established.

8. CONCLUSION

The previous sections have contained brief conclusions which will not be presented in detail here. Rather it will be useful to attempt a broader conclusion that spans all of the sections.

1. The telephone companies have been successful although that does not imply that they have been economically efficient. The latter requires that effective actual or simulated competition exists. Since there has been no competition, these firms have not had the environment required to generate efficiency.

2. The companies have tended to adopt many practices from the rest of the North American industry. This has been a source of some of both their strengths and weaknesses. They have been able to avoid serious technological mistakes by purchasing technologies from world-wide suppliers. This has prevented the serious errors often committed by government enterprises who try to develop their own technologies. On the other hand, the pricing practices and regulatory schemes have been similar to those in the rest of the industry. These have not been judicious choices.

3. The historical goals of the government enterprises were somewhat unrealistic. The attempt to introduce lower rates than the private firms and extend service throughout the province

had mixed success. Lower rates were not achieved in the initial two or three decades. Much later, due to the growth in toll revenue and the existing price structure, lower rates were achieved. While these lower rates are politically popular, they do not provide a rational use of resources. Unfortunately the public fails to properly understand the subsidies encompassed in these rates.

The government enterprises were more successful than the private companies at extending service to the rural areas. This success was based on a willingness to subsidize the rural areas and does not imply any mistakes by the private companies whose motivations were different. The rural areas were not served very well until the last quarter-century when the part of the surplus from toll revenue and other cost saving innovations could be devoted to expanding rural services.

4. The government enterprises have a cost advantage which is used to help maintain low local rates. The advantage arises from both the exemption of government enterprises from the Federal corporate income tax and the firms' capital structure. The latter is not primarily due to lower interest rates for the public firms. Rather, it is the lower returns to debt relative to equity combined with the public firms' higher debt ratio that implies a cost advantage. These two sources of cost advantages are artificial in a social sense and need reviewing. In a complex

world, with many taxes and subsidies there is no simple answer to what are the social costs of capital. However, it is not the actual costs as currently used by these firms. The governments need to re-assess the goals required in regard to the cost of capital. Before being to harsh on the telephone companies, one should remember, that governments tend to use actual capital costs when evaluating their own projects in other areas.

5. The future of these enterprises is likely to be difficult. I do not believe that they should or can hide from expanded competition. The latter will massively alter their prospects. First, the government must decide if there will be a subsidized and regulated portion of the telephone network. If the answer is yes, then the problems of separating the competitive and non-competitive portions will expand. Better solutions to these problems are required if the firms are to remain in both types of markets. The continuance of the firms in the competitive markets requires some justification in the long-run. What goals are government enterprises pursuing in competitive markets? The customer equipment markets are the ones in which the enterprises could most easily withdraw over time. The markets for transmission services are more difficult to withdraw from until alternative suppliers actually exist. This may occur shortly for long distance traffic.

The government enterprises will probably have a role in the regulated markets for a number of years. If these markets are to include subsidies then the government needs to find alternative methods for financing these subsidies. Internal subsidies should be eliminated.

9. BIBLIOGRAPY

Alberta, Government of the Province of, Public Utilities Board Act, Queens Printer, Edmonton.

_____, Municipal Telephone Act, Queens Printer, Edmonton.

_____, The AGT-Edmonton Telephones Act, Queens Printer, Edmonton.

_____, Alberta Government Telephones Amendment Act, 1983, Queens Printer, Edmonton.

_____, Utilities Statutes Amendment Act, 1983, Queens Printer, 1983.

Alberta Government Telephones, Annual reports, annual.

Alchian, A. and H. Demsetz,(1972) "Production, Information Costs and Economic Organization", American Economic Review, 62, 777.

Averch, A. and L. Johnson,(1962) "Behavior of the Firm under Regulatory Constraint", American Economic Review, 52, 1053-69.

Babe, R.(1976)"Performance Analysis of Selected Common Carriers", Reprort to the Federeal Department of Communications, Ottawa.

Baron, D.P. and R. de Bonde (1981), "On the Design of Regulatory Price Adjustment Mechanisms", Journal of Economic Theory, 24, 70-79.

Baumol, W.J. (ed.) (1980), Public and Private Enterprise in a Mixed Economy, Macmillan, London.

Berkowitz, M. and P. Halpern (1981) "The Role of Crown Corporations in the Efficient Production and Use of Electricity", Institute for Policy Analysis, University of Toronto.

Borcherding, T., W. Pommerehne and F. Schneider (1982), "Comparing the Efficiency of Private and Public Production: The Evidence from Five Couintries", in Bos et. al.

Borcherding, T.(1983) "Toward a Positive Theory of Public Sector Supply Arrangements", in Pritchard.

Bos, D., R.A. Musgrave and J. Wiseman (eds), (1982) Public Production, Springer-Verlag, Wien, New York.

Breton, A.(1974) The Economic Theory of Representative Government ,Aldine, Chicago.

Britnell, G.(1934) "Public Ownership of Telephones in the Prairie Provinces", MA thesis, University of Toronto.

Canadian Privy Council Office (1977), Crown Corporations: Directions Control, Accountability, Supply and Service, Ottawa.

Cashman, T. (1972) Singing Wires, Alberta Government Telephones, Edmonton.

Caves, D. and L. Christensen (1980) "The Relative Efficiency of Public and Private Firms in a Competitive Environment", Journal of Political Economy, 88, 958-976.

Coase, R.(1937) "The Nature of the Firm", Economica, 4, 386.

Collins, R. (1977) A Voice from Afar: The History of Telecommunications in Canada , McGraw-Hill Ryerson, Toronto.

Denny, M. (1984) "Government Enterprise Performance", mimeo.

Department of Communications, Financial Statistics on Canadian Telecommunications Carriers, Ottawa, annual.

Donaldson, G. (1961) Corporate Debtr Capacity: A Study of Corporate Debt Policy and the Determination of Corporate Debt Capacity, Division of Research, Harvard Business School, Boston

Downs, A.(1957)An Economic Theory of Democracy, Harper and Row, New York.

Fisher, F.M. and J.J. McGowan (1983), "On the Misuse of Accounting Rates of Return to Infer Monopoly Profits", American Economic Review, 65, 966-977.

Jensen, M. and W. Meckling (1976) "Theory of the Firm: Managerial Behavior, Agency Costs and Ownership Structure", Journal of Financial Economics, 7.

Jones, L.(ed.) (1982) Public Enterprises in Developing Countries, Cambridge University Press, New York.

Jordan, W. (1982) "Canadian Airline Performance Under Regulation", Economic Council of Canada, Regulation Reference, W.P. 29, Ottawa.

Kahn, A. (1971), The Economics of Regulation, Vol. I and II, Wiley,NY.

Lipset, S.(1968) Agrarian Socialism,, Doubleday, Garden City, N.J.

Manitoba Telephone System, Annual Report, annual.

Miller, M. (1977) "Debt and Taxes", Journal of Finance, 32, 261-275.

Modigliani, F. and Miller, M. (1958) "The Cost of Capital, Corporation Finance and the Theory of Investment", American Economic Review, 53, 261-297.

Myers, S. (1984) "The Capital Structure Puzzle", Journal of Finance, 39, 3, July, 575-592.

Myers,S. and N. Majluf, (1985) "Corporate Financing and Investment Decisions When Firms Have Information Investors Do Not Have", Journal of Financial Economics, forthcoming.

Niskanen, W.(1971) Bureaucracy and Representative Government, Aldine, Chicago.

Owen, B. and R. Braeutigan (1978), The Regulation Game, Ballinger,Cambridge, Mass.

Pritchard, J.R. (ed.) (1983) Crown Corporations in Canada, Butterworths, Toronto.

Pryke, R. (1971), Public Enterprise in Practice, MacGibbon and Kee, London.

Pryke, R. (1981), The Nationalized Industries: Policies and Performance Since 1968, Martin Robertson, London.

Public Utilities Board, Alberta,(1984) Decision No. E84083, Alberta Government Telephones, volumes 1 and 2, Edmonton.

Redwood, J. (1980), Public Enterprise in Crisis, Basil Blackwell, London.

Redwood, J. and J. Hatch (1982), Controlling Public Enterprises, Basil Blackwell, Oxford.

Richards, J. and L. Pratt, (1979) Prairie Capitalism: Power and Influence in the New West, McClelland and Stewart, Toronto.

Saskatchewan Telecommunications, Annual Report, annual.

Saskatchewan Telecommunications,(1983) Changing Challenges into Achievements, Regina.

Stigler, G. (1957) "The Division of Labour is Limited by the Extent of the Market", J. of Political Economy, 59, 185

Stinson, M. (1980) The Wired City, Edmonton Telephones, Edmonton.

Waverman, L.(1982) "The Process of Telecommunications Regulation in Canada", Economic Council of Canada, Regulation Reference, W.P. No. 28, Ottawa.